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OIL WORLD
and Petroleum Industry

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"Slickest Valve WE EVER USED"

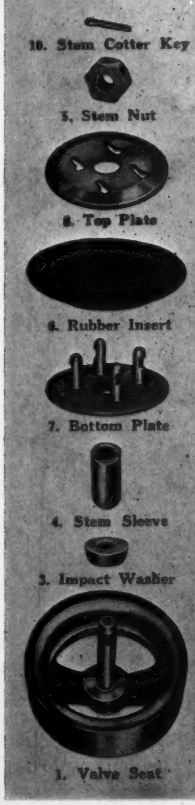
Even operators who are "tough to convince" admit after thorough tests that this new "engineered" SECURITY SLUSH PUMP VALVE is extremely efficient in service—and gives from 50% to 200% longer service than other valves.

YOU WILL APPRECIATE THIS!

Even though Security Valves outlast ordinary valves, and the Valve Seats are practically indestructible, the time will come when some of the parts must be replaced.

You will appreciate then the simple design which makes it an easy matter to take the Valve apart, replace worn parts and re-assemble, using only a hand hammer.

It is easy to replace the Rubber Insert and the Top Plate over the posts on the Bottom Plate. Then the Top Plate is moved to a centered position which causes the machined slots in the posts to lock in the L-shaped holes milled through the Top Plate. When the assembled Valve is placed over the Valve Stem the lock is completed and the Top Plate cannot be removed until the complete assembly is taken off the Valve Stem. A light tap with a hand hammer will release or lock the entire assembly.



The Impact Washer and the Stem Sleeve are now placed over the Valve Stem—the Valve is slipped over the sleeve—and the Stem Nut (secured with a cotter key) locks the complete assembly in operating position.

WHY ORDINARY VALVES FAIL

Experienced operators know that the terrific impact of valves on seats plus the abrasive wear on the sealing surface of valve seats are the principal causes of early valve failures with resultant shut-downs for repairs and replacement of parts.

WHY SECURITY VALVES ARE BETTER

In Security Slush Pump Valves the impact is not taken by the sealing surface of the valve seat, but by a hardened Impact Washer which slips over the Valve Stem and rests upon a strong bridge across the bottom of a forged heat-treated Valve Seat.

Sealing is effected by the concaved curved surface of a rubber insert which contacts the convex curved surface of the Valve Seat.

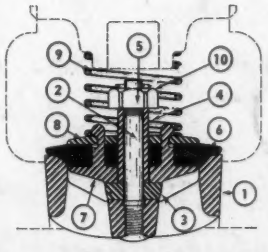
THE VALVE STEM IS PART OF THE SEAT

. . . which provides these advantages:

1. Wear by the Valve Stem operating in the cross bar is entirely eliminated, which causes the Valve Seat to last far longer;
2. Cap Guide Bushings for the Valve Stem are not required;
3. A constant, pre-determined valve lift is easily secured;
4. It is not necessary to have on hand several types and designs of Valve Stems for pumps of various makes all of which have the same general valve seat size.

HOW SECURITY VALVES OPERATE

A postive and long-lasting seal is provided between the Rubber Insert and the Valve Seat due to the fact that the sealing surface is curved—not tapered or flat. When wear, due to long, hard service, requires the valve to close at a lower position in the Valve Seat, the curved surface of the Rubber Insert merely slides downward around the curved surface of the Valve Seat. The rubber is not subjected to the flexing or tearing action which occurs when the flat or tapered rubber inserts in ordinary valves are wedged down into the valve seats.



A TEST WILL CONVINCE YOU

There is only one way to find out how good Security Valves really are—test one or more of them opposite the best valve you are using now. It won't be long until you too will have discovered "The Slickest Valve You Ever Used."

SECURITY ENGINEERING COMPANY

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Bakersfield—Ventura—Kettleman Hills

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Gulf Coast: Wilson Supply Co., Houston, Texas
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SECURITY VALVES

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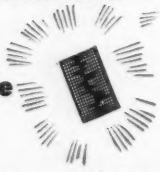
1932

FIVE YEARS AGO, Bill Lane, Walt Wells and one employee began operations in a small shop selling packers and experimenting with perforating equipment. Today, Lane-Wells Co. personnel numbers 157, housed in one of the most modern of oil field equipment plants on a five acre site operates a fleet of 19 field service trucks and has successfully perforated nearly 7,000 oil wells. Lane-Wells products are used internationally. There must be a reason. Perhaps it's because Lane-Wells Gun Perforators Packers and Liner Hangers and Stratigraph Service  get results! Contact the nearest office for further details on the companies that produce "tomorrow's tools today".

1937

THE LANE-WELLS CO.

Gun Perforator Service

LOS ANGELES, CALIFORNIA ○ NEW YORK CITY, NEW YORK

THE LANE-WELLS CO. OF TEXAS—HOUSTON & CORPUS CHRISTI • THE LANE-WELLS CO. OF OKLAHOMA—OKLAHOMA CITY & TULSA

CALIFORNIA
OIL WORLD
and Petroleum Industry

THE WORLD'S OLDEST OIL TRADE PUBLICATION

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COMING EVENTS

February 23-25
Ohio Petroleum Marketers Assn., Annual Convention and Trade Exposition, Hotel Deshler-Wallick, Columbus, O.

February 23-25
Wisconsin Petroleum Assn., Annual Convention and Equipment Show, Plankington Hotel, Milwaukee.

February 24-25
Iowa Petroleum Assn., Des Moines, Iowa.

March 17-19
American Association of Petroleum Geologists, 22nd Annual Convention, Biltmore Hotel, Los Angeles.

February 24-26
Assn. of Highway Officials of North Atlantic States, 13th Annual Convention, Hotel Pennsylvania, New York.

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See Pages 83, 84, 85 and 86 in the 1937 Composite Catalog. Also see Shell Oil Co. story in this issue.

Model V Backfiller with "Caterpillar" Diesel RD4 Tractor, Owned by Apex Construction Co. (Williams Brothers) of Houston, Texas, and Tulsa, Okla.

CALIFORNIA
OIL WORLD
and Petroleum Industry

Who Owns The Tidelands?

California's lawmakers should go slow in legislating on tideland oil development until the question of proprietary ownership of such lands has been settled either by a decision of the U. S. Supreme Court or by an Act of Congress ceding title to the State of California. The Constitution vests Congress with the exclusive right to dispose of public lands of the United States, hence we doubt if any renunciation of title by the executive branch, or any opinion of the U. S. Attorney General as to where title now rests, will be worth the paper it may be written on, when and if Congress should ever see fit to open the question.

So far as we can learn, the question of proprietary title to tidelands, as between the State and the Nation, has never been raised in court, still less judicially passed upon. Sovereign rights over such lands confer no proprietary title; if they did, all public lands would be the property of the state in which they may be located.

Pending tideland bills should be sidetracked until title is settled beyond all doubt. Such settlement will be impossible until long after the present legislative session is ended. Opening of new fields while land titles are in doubt will prove unfortunate both for the state and its lessees.

Tideland oil is being developed along Louisiana's Gulf Coast. It may extend further east. It certainly will come some day at several points on the California coast. It may easily be undertaken, perhaps successfully, on the Oregon and Washington coast. So it should be clear that the question extends far beyond the water front at Huntington Beach, even beyond California, the state where the question has been first raised, hence the likelihood that Congress will some day force litigation to determine title if the Federal executive fails to act.

At present the U. S. Attorney General has pending before him a request that he institute court action to try title, and Senator Walsh of Massachusets, chairman of the Public Lands Committee, has advised interested Californians that he has under consideration a bill to assert the Federal title and to make it effective.

And now if the United States attempts to eject the State's lessees from property which they have developed in good faith, and paid royalty to the state, what will Attorney General Webb, the State Department of Finance, our Governor, and the Legislature do to protect them? We all remember how promptly our Attorney General acted against the small producers who developed the Huntington Beach tidelands. Will he act as promptly when and if they are attacked? Will he start action in the name of the state to assert its title and protect its lessees?

STANDARD OIL COMPANY

of California

By Douglas G. McPhee

Chapter II—Consolidation . . . 1884-1900

Mitchum, Tully and Company, California investment bankers, cooperating with the California Oil World, are making possible this series of articles telling of the origin, growth, and development of the companies making up the California oil industry of today.

Up to 1884, the story of the petroleum industry in California can be fairly well told in terms of the organization which later became the Standard Oil Company of California, but which existed at that time under the corporate name of Pacific Coast Oil Company. In 1884 the company and the industry were, practically speaking, one and the same thing. Other men, under other banners, were exploring and prospecting, but from a commercial standpoint Pacific Coast Oil Company was, to all intents and purposes, synonymous with oil development on the western slope.

This company had virtual control of the state's commercial production, through its Ventura County wells. It was a long step ahead in transportation, having connected its producing area with the coastwise railroad through the state's first pipeline. It had the only important refinery on the Pacific Coast in its recently constructed plant at Alameda Point, boasting nine stills and credited with an annual capacity of 1,000,000 gallons. It had entered the export trade, and was supplying faraway markets of the Pacific Basin.

But from this point, although the progress of the oil industry was directly influenced in all its phases by the leadership of Pacific Coast Oil Company, it was no longer the accomplishment of one concern. Therefore, a choice must be made between telling the story of the industry as a whole and tracing the development of the individual company. Our purpose here is not to review the industry in general, but to follow the Pacific Coast Oil Company through the succession of events which led it to its present position as the Standard Oil Company of California. In order to do this, it may be necessary to focus temporarily on the one organization to the exclusion of other companies which were also significant forces in shaping the industry during its formative years. This, however, is only a temporary omission; our project will eventually bring us back to these other companies; we shall get around to relating their achievements in due course.

The Company Digs In

We have already noted the rapid expansion of the producing, refining and marketing departments of the Pacific Coast Oil Company in the five years from the date of its incorporation to 1880. Its president, C. N. Felton, estimated the total of its investments during those years as $2,500,000. The following period—the middle eighties—does not appear to have been one of sensational growth, but rather one of digging in and consolidating the ground gained in the original bold venture.

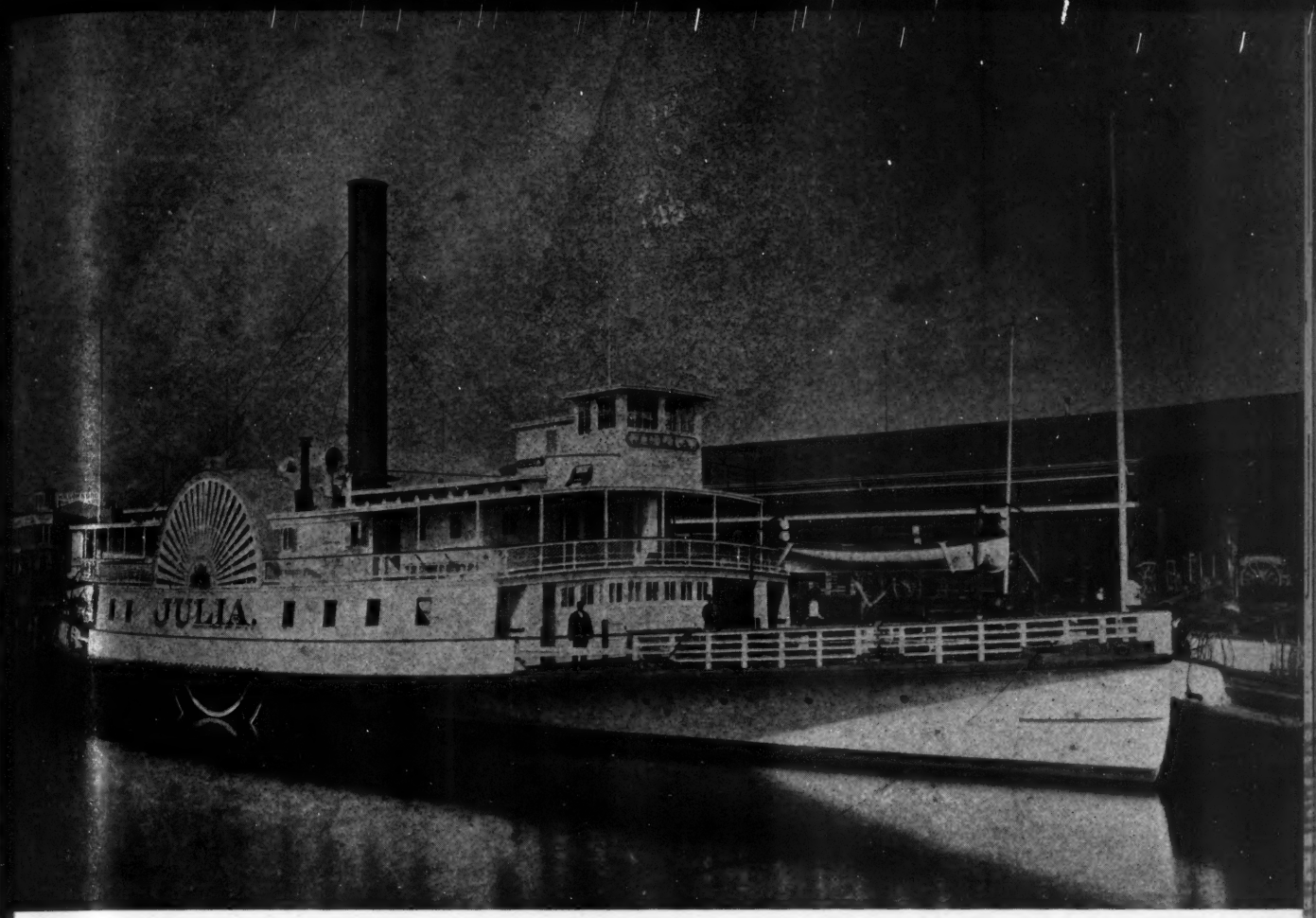
There were no doubt countless problems to be solved in the process of what we would call today "working the bugs out" of the organization; for this was an enterprise set up on a big scale in audacious disregard of the limitations of the present, and with a lively prevision of the future.

These were not years in which the petroleum industry was striding ahead with seven-league boots. Production was confined to the unspectacular Ventura-Newhall field, and its wells yielded no more in 1891 than they did in 1885, in spite of continued field activity. In addition, there were serious technical difficulties to be met at the refinery, for it was not easy then to obtain from California crude a kerosene as satisfactory as that refined from eastern oils. Pacific Coast Oil Company put its corporate nose to the grindstone, and settled down to the hard, unromantic, routine work of realizing in practical fact the ambitious industrial dream of its founders.

But there was an important development on the marketing side—one which was destined to touch the Pacific Coast company intimately. In 1884 Standard Oil Company came west, and within a few years the two organizations—Pacific Coast as a California producer, refiner and marketer, and Standard Oil as an aggressive competitor in the distribution of petroleum products—stood out as leaders in their respective functions. They were inevitably important to each other.

Standard Oil's Genesis

A little over a year after Colonel Drake's well flowed at Titusville,



The steamer "Julia", launched by Central Pacific Railroad Company for Sacramento river service in the late 60's, is one of the boats on which the Pacific Oil Company conducted intensive fuel oil experiments.—Photo courtesy S. P. Company.

overproduction appeared. Crude oil had sold, in the first frenzy of the oil boom, at $20; now it was $2. It was at this time that the name of John D. Rockefeller was first heard in connection with petroleum. He was only 21 years of age, but he was already one of Cleveland's conservative and respected citizens, known for personal reliability and sound business judgment. Young Mr. Rockefeller was asked by several of his business colleagues to investigate the oil strike at Titusville and report his findings.

As he looked over the oil industry of that day he saw disorder, incompetence and competitive waste. He recognized that the producing end of the business was, and would be for a long time, chaotic and unstable. (He was quite right; two years later crude could be bought for 10 cents a barrel.) But he saw that the consuming side of the oil business was different; there were fundamental, stable consumer-wants to be supplied with the products that the new industry could provide.

Rockefeller and his associates decided to embark upon a business of meeting those wants, buying, refining and marketing the products of petroleum. In general, their policy was to leave production to others. On such a basis was launched a career that was to make Rockefeller a synonym for wealth, and the name of his company a synonym for success in the oil business. The policy proved so sound that, by 1870, Cleveland had become the major refining center of the nation. Rockefeller and his friends owned the largest refineries in the world; they had their own warehouses, tank cars, laboratories and selling agencies. It was then that they formed the Standard Oil Company and incorporated it for $1,000,000. Within another five years the products of Standard Oil Company — kerosene, axle grease, candles and lubricants —were sold in most states of the Union and nearly all the countries of Europe.

Standard Comes West

The Standard Oil idea, of course, called for nation-wide and world-wide operations. Nothing could be more natural than that the company should look with interest on the crescent market of the Pacific West. California's population had increased by 129 per cent in the preceding decade; the Coast was interesting not only for its own possibilities, but as a natural gateway to consuming markets across the Pacific. And from the point of view of 1880, it seemed to be as wide-open and inviting a sales field as any in the world, for the California production of that year was a mere 50,000 barrels of crude oil.

Standard came west with characteristic Standard thoroughness. By 1883 it had become a real factor in

Site of the Standard Oil Company's Richmond Refinery in 1901.

petroleum distribution in California, Oregon and Washington. It was in this year that Yates and Company, an important Standard distributor, excited San Francisco with one of her first industrial parades. A cortege of five shining blue and red Standard Oil tank wagons was proudly led through the traffic of Market Street by one "Mike" O'Connor. A year later the Standard Oil Company established its own Pacific Coast headquarters in San Francisco. A small office, employing three men, was opened on California Street. By 1889 sales agencies had been opened in principal California cities—Stockton, San Diego, Oakland, Fresno, Marysville and Los Angeles. At the same time Standard strengthened its sales position in the Northwest by opening agencies in Portland, Spokane Falls, Seattle, Colfax, Tacoma and Spokane.

In each of these agencies the early Rockefeller principles of economy and efficient distribution were rigidly maintained. Wide territories were covered by every branch. Every agent had many duties, sometimes acting as salesman, warehouseman, deliveryman and stableman. Economy was the rule, profit the result. Within a short five years and in a country hardly out of its pioneering phase, the Standard Oil Company had established an amazingly complete distribution of Pearl Oil, Eureka Harness Oil, Mica Axle Grease, Boston Coach Oil and Favorite Sewing Machine Oil.

Finding New Outlets

While Standard was busy building its western sales and marketing organization, Pacific Coast Oil Company, in its own way, was looking for larger markets for its products, and for new products that could be produced from the crude which it controlled. Again it seems indisputable that Pacific Coast was basing its policies on a confident belief that a big industry would eventually evolve from the modest beginnings of California petroleum, for in the Alameda Point laboratories new uses were discovered, and new refined products were developed for the increasing supplies of crude oil which somebody foresaw.

While illumination continued to be the most important field for exploitation, and kerosene the product of chief value, fuel oil was taking on a heightened importance, and lubricants represented a steadily growing sale. Oil was definitely beginning to replace coal for many industrial purposes. Sales reports of 1887 gave evidence that machinery was affording a profitable outlet, and the company's ledgers showed mounting shipments of cylinder oils, valve oils and general machine oils.

Transportation was not overlooked as a potential market. Pacific Coast Oil Company conducted in 1887 the first extensive experiments in the use of petroleum as a fuel for steamers. The State Mineralogist's report on the results of the experiment gave conclusive evidence that the experiments had been worth while. It said:

"The Pacific Coast Oil Company, through the kindness of the Central Pacific Railroad Company, this year made a thorough examination into the use of petroleum as a fuel on their steamers in company with Mr. William McKenzie, Division Master Mechanic and Chief Engineer of Steamers. After lighter oils had been driven off in the oil company's refinery the residual was used as fuel oil on four steamers with the following results:

The steamer Piedmont (2 months test)

Cost per mile run with Carbon Hill Coal 91.35c
Cost per mile run with oil..71.95c
Savings in favor of oil ...21.24%

The other three ships showed gratifying savings as well:

The Julia—savings in favor of oil 22.38%
The Transit—savings in favor of oil 9.8%
The Oakland—savings in favor of oil 24.43%

Of course, the officials of Central Pacific were impressed with the economies. Oil had found a new outlet and the Pacific Coast Oil Company a big new customer.

Another major use for oil was found in transportation — the railroads. With the invention of the combustion-chamber fire box for locomotives and the replacement of old

equipment, railroads all over the world became large users of oil.

Transportation Problems

Petroleum in California was maturing. The new products developed by Pacific during this period had stimulated sales and there was an evident need for greater production and better transportation. The company rose to the need. New lands were acquired in fields that showed promise. New machinery was purchased. Drilling was improved. Wells were sunk to the fabulous depth of 1900 feet. Oil moved from field to railroad siding through the company's seven-mile pipeline. But here lay a difficulty that the Pacific Coast Oil Company had not yet conquered. How to move crude oil to the Alameda refinery quickly and economically? Railroad transportation was slow and costly; the rail rate on crude oil from Santa Paula to San Francisco was $1 a barrel; long pipe lines were not yet feasible under California conditions.

The answer to the transportation problem was not long in coming. In 1888, with characteristic courage, the Pacific Coast Oil Company built a tanker, the "George Loomis," named in honor of the man who, by this time, had succeeded Felton as president of the company. It was the first steel oil tanker constructed and operated on the Pacific Coast and the second steel steam-driven tanker built in the United States.

To General Manager D. G. Scofield and his associates, this 175-foot craft with her cargo capacity of 6500 barrels was an impressive sight, and her launching was a historic step in the fulfillment of their plan. In the meantime they had extended their Newhall pipeline 44 miles to Ventura. A few days after the "George Loomis" was launched, the last major transportation obstacle had been surmounted, and transportation from field to refinery under the company's private control was an accomplished fact. (Rail rates from Santa Paula to San Francisco promptly fell to 50 cents a barrel.)

Two Companies Join Hands

Thus, in the late eighties, Pacific Coast Oil Company stood out as an integrated oil enterprise, unchallenged in the western field, with producing, transporting and refining facilities; Standard Oil Company, in the same territory, had set up a strong marketing organization. It was unavoidable that the two companies should be attracted to each other, and that each should see the advantages that might be gained from a close alliance.

In 1890, the two organizations met on common ground and decided to effect such an alliance. Standard contracted to sell Pacific Coast's entire output. In the decade that followed, each company, specializing in its own activities, strengthened its position still further, and in 1900 Standard took over the ownership of the Pacific Coast Oil Company by stock purchase. By this transaction Standard Oil became a direct factor in all phases of the California petroleum industry, although for another six years Pacific Coast Oil Company maintained its own name and operated as a separate entity.

The 1st decade of the 19th century was an eventful one for the California industry as a whole. In '94, three new producing fields came into existence, of which the Los Angeles-Salt Lake field was the most important; within a year it was producing more than the Ventura-Newhall district, and in '97 it accounted for 70 per cent of the state's total production. In '98 and '99 the Coalinga field shot into prominence with its spectacular gushers. The famous Blue Goose well of the Home Oil Company roared in with an initial flow of between 1500 and 2000 barrels a day. A new oil fever struck the state; within three years 2400 oil companies were incorporated, and half of these actually engaged in drilling. By 1900, Ventura County had dropped in relative importance until it accounted for only one-tenth of the state's production; Los Angeles County, Kern County and Fresno County were the leaders — representing, among them, nearly 80 per cent of the California total.

But Pacific Coast Oil Company, secure in its intimate tie-up with Standard Oil, was able to take these events in stride; it expanded its production moderately, acquiring promising lands in the new fields; it maintained unquestioned leadership in refining, and by 1900 it was pressed for refining facilities, and

Portland Main Station Plant of the Standard Oil Company, in 1898.

considering the possibility of constructing a new and much greater refinery to replace its Alameda Point plant.

Thus it rounded the turn of the century no longer alone in its industry but comfortably ahead of the field. It had spent the past 15 years in a new kind of pioneering—not blazing a trail through rocky canyons to sink a hopeful hole, but thinking ahead, preparing a way for an industry, adjusting, tightening and tuning up an organization to be ready for an epochal stage of growth that lay just around the corner.

An industrial writer of the day took it upon himself to predict the future of California petroleum when he wrote, in 1900:

"The distribution of oil from this state has for some years past ranged upwards of two million barrels. The quantity sent out last year exceeded the four million figure (4,329,950 barrels to be exact). The annual consumption of the California, Oregon and Washington territory together with our exports may be set down at this figure; for the demand has been undergoing rapid enlargement. Our exports of petroleum now go mostly to British Columbia, Asia and Asiatic Russia, with a little to Mexico, South America and the Islands of the Pacific. We shall probably be able, in the course of a year or two more, to supply the product of our California wells not only to those countries but to all the Islands of the Pacific (he included, of course, Australia and New Zealand) and to the entire coast from Cape Horn to Bering's Strait, and eastward to the Rocky Mountains. Nor can we see any reason why we should not, in time, command the markets of the Orient."

This forecast, optimistic and visionary as it seemed when it was written, was, as a matter of fact, amazingly inadequate. Within a little while, Standard Oil was to ship millions of gallons of California petroleum products annually to the four corners of the globe.

But all that was hidden on a page just being turned. No one could know that this industry, still dependent chiefly on kerosene, stood on the brink of a boom almost incalculable. In little bicycle shops and basements, a few men were tinkering with queer contrivances which they believed might propel themselves by their own power, obtained by exploding a liquid hydrocarbon within the prison of a cylinder.

As Pacific Coast Oil and Standard Oil, allies, watched the 19th century pass, they had no realization of what those experiments with horseless carriages were to mean in the following decades. The oil industry had not yet reached its modern era; but the company founded and fathered by Scofield had attained maturity. It had been the dominant factor in California petroleum during a pioneering era. It had become an acknowledged leader. It had built soundly and strong upon the foundations laid in the daring years of the seventies. Now it was ready for what might come with the new century.

(Chapter III of this series will appear in the next issue)

Corkery New Oil Official

A. K. Corkery has become secretary of Mountain Petroleum in place of A. W. Schwocho, who has resigned.

Mountain Petroleum is operating in Fruitvale, and will start an offset to the Magnet and Exeter wells, with production expected at 4200 ft.

"Drilling Control" Issued

The booklet, "Drilling Control," which completely described the place of the "Quintuplex" in modern drilling, has recently been revised. The third edition is now being distributed. Copies may be obtained from the Martin-Decker Corp., Long Beach.

Noble, Hoots Get Promotions

Earl B. Noble and H. W. Hoots

Earl B. Noble, formerly assistant manager of exploration for Union Oil Co. of California, has been appointed chief geologist, according to Desaix B. Myers, manager of exploration. Noble is a graduate of Yale, with post graduate work in geology at the University of California, and entered the employ of Union Oil Co. as a geological scout in 1923. For a number of years prior to his association with Union he was a member of the State Mining Bureau, Division of Oil and Gas, and is a past president of the Pacific Coast section of the A.A.P.G.

H. W. Hoots is now assistant chief geologist. He is a graduate of Stanford, and joined the staff of Union Oil Co. as geologist in 1928.

Meter Association Meets

According to Guy Corfield of the Los Angeles Gas and Electric Corp., president of the Southern California Meter Assciation, plans are rapidly being completed for the tenth annual "High Jinks" of that organization to be held at the Breakfast Club on Riverside Drive Feb. 27. Jimmy Dunn of the American Recording Chart Co. is chairman of the entertainment committee, with Bob Angel, Union Oil Co., arranging the program for the evening. Dinner will be served at 7:30 p. m., followed by an evening of entertainment. Tickets are $2.

Field Development

San Joaquin Valley

Reserve Well Idle; Repairing Gas Traps

Even though attention is still centered on the Reserve Oil & Gas Co. wells on the Tejon Ranch, there have been few developments of outstanding interest since the company installed gas traps on its No. 33-3. At present, the well is idle, awaiting repairs on the traps, the repairs being necessitated by the extremely high gas pressures encountered. The gas, on a charcoal test, showed a recovery of about one gallon per mcf, indicating that on a more exact test, at least a couple of gallons per mcf may be expected.

The active well in the area, Reserve's 33-2, is sidetracking at 4238 ft. Cores from that level show hard shale, which will continue for the next 216 ft. This exact depth is known, of course, because the well had been drilled past that level before encountering the fishing job which necessitated the present sidetracking. From present indications, this well is 57 ft. higher on the structure than No. 33-3.

No. 33-3, before being shut in, started flowing on Feb. 17, making an estimated 12,500,000 c.f. of gas with a spray of light oil. The well was then shut in, with a pressure of 1700 pounds, and after being reopened, flowed 6,000,000 ft. of gas through a 26/64-inch bean, with some light oil. Total depth of the well is 4431 ft., with 8⅝-inch casing at 4380 ft. Both of these wells are on sec. 33, 11-19, about three miles north of the foot of the Grapevine grade on the Los Angeles to Bakersfield highway.

The Ohio Oil Co.'s D-1, on sec. 21, 11-19, a little more than two miles north of Reserve wells, started swabbing last Sunday, and has been getting about 25 bbls. of light oil per day. This well is down 6637 ft., with 8⅝-inch casing at 6637 ft., indicating that it is considerably lower on the structure than either of the Reserve wells.

There is one other well in the immediate area, Buffalo Oil Co.'s Tejon No. 1 on sec. 5, 10-19. The well is down 1747 ft. and is idle.

Continental Wasco Well At 9545 In Shale

Continental Oil Co.'s deep wildcat three miles west of Wasco, sec. 8, 27-24, is down 9545 ft. in hard shale with streaks of sand showing gas and some traces of oil. This well, K. C. L. No. A1, is attracting considerable attention due to the difficulty caused by the gas pressure, and because of the important location of the test itself.

A new venture, participated in jointly by Continental and Seaboard Oil Corp. was announced last week. The new test, which will be located in sec. 26, 27-24 on Kern County Land Co. ground, will be drilled by Seaboard, to be known as Seaboard-Continental K. C. L. No. C1.

Five Wells Drilling In New Greeley Area

Five wells are drilling in the Greeley area, with three more rigging up and one producing. The producing well is Standard Oil Co.'s discovery, K. C. L. 11-1 which continues to flow, through a 12/64-inch bean, 440 bbls. of 37.5 gravity oil cutting 1.2% per day. Tubing pressure is 1100 pounds and there is 2300 pounds on the casing, with 400,000 c. f. of gas.

Standard has three other wells drilling, and another rigging up. K. C. L. 11-2 is drilling ahead at 6517 ft., K. C. L. 12-1 is down 5385 ft. in shale and K. C. L. 14-1 is 5654 ft. deep. The company is rigging up K. C. L. 11-3, located in sec. 20, 29-26.

Continental spudded in K. C. L. No. B-1 in sec. 12,29-26 on Feb. 11. Mohawk Petroleum Corp. and Petroleum Securities Co. are both rigging up wells in sec. 23, 29-25. Tidewater Associated is redrilling its K. C. L. No. 1 at 8132 ft. The hole was bottomed at 8302 ft. This well is located in sec. 30, 29-25.

Seaboard Abandons Pixley-Ducor Test

Seaboard Oil Corp. Security No. 1, a test in the Pixley-Ducor area, in sec. 16, 23-26, ran into the top of the metamorphics at 4121 ft. and was carried to 4127 ft., after which the company announced that the well would be abandoned. No showings of importance were encountered.

G. P. To Deepen Arvin Producer

General Petroleum Corp. has decided to deepen Arvin No. 1, a wildcat located about 13 miles southeast of Bakersfield. The well was drilled to 7462 ft. and on the pump has been producing from about 700 ft. of formation. On Feb. 5 it pumped 170 bbls. gross, cutting about 50% in 23 hours. On the following day it pumped 103 bbls. gross, cutting 44%. On Feb. 7 it produced 81 bbls. gross, again cutting 50%. The company then pulled the rods and tubing and bailed for a time. Put on the pump again on Feb. 10, the well produced 175 bbls. in 16 hours, and its most recent production was approximately 120 bbls. gross, cutting 28%.

It is the company's plan to take in an additional 100 ft. of Santa Margarita formation, and test the combined zones to see if this well cannot be made into a substantial producer.

Superior Oil Co. has staked a location in the same section but does not intend to drill until more complete information is available concerning the General Petroleum well's productivity.

McDonald Island Well Flows During Test

In the McDonald Island Area, sec. 31, 2N-5E, Standard Oil Co.'s Tilden Community No. 1, bottomed at 5310 in gas sand, flowed during a formation test at the rate of 15,000,000 c. f. Flow pressure was 900 pounds and the well was open nine minutes. The company will now set casing.

Grimm Quits Pac. Westn.

Paul Grimm, president of the Pacific Western Oil Co., is resigning from his post in the immediate future, to form an oil company of his own to operate in both the Mid-Continent and California.

Shell Completes Third 10 Sections Producer

Shell Oil Co. completed its third producer in Ten Sections when it brought in K. C. L. No. A34 on Feb. 12 for 2350 bbls. of clean oil, 33.8 gravity and 2,500,000 c. f. gas. The well is bottomed at 8477 ft., plugged to 8420 and was perforated at intervals from 8033 ft. to bottom.

The new well is located in sec. 29, 30-26, about 1750 ft. northeast of Shell's second producer in this field. Because the oil is of much lower gravity than the other wells, K. C. L. No. A34 is probably lower on structure than the first two completions.

Shell's K. C. L. No. A78 is down 7860 ft., with 9⅝-inch casing standing cemented at 7855. Signal Oil & Gas Co. K. C. L. No. 1 is drilling ahead at 4520 ft. in sand and shale. Standard's K. C. L. No. 9-1 is down 8915 ft., with 7-inch blank liner cemented at 8162 ft. The company had water difficulties here and the well is now standing recemented. Superior Oil Co.'s wildcat in sec. 11, 30-26, is down 10,409 ft. in hard shale with 7-inch casing standing cemented at 10,380.

Arkelo Lerdo Wildcat Fishing At 8475 Ft.

Arkelo Petroleum Co. No. 1, deep wildcat in the Lerdo area, in sec. 23, 28-26 about 10 miles north of Bakersfield, is down 8475 ft. with work temporarily halted by a fishing job. Three cones from a rock bit were lost in the hole, with one recivered immediately.

Crawford Returns to Gulf

L. A. "Pete" Crawford, recently returned to his sales duties in the Mid-Continent and Gulf Coast after spending a vacation at the Martin-Decker plant at Long Beach, California.

Amerada Completes Rio Vista Gasser

Another well was completed late last week in the Rio Vista gas field when Amerada Petroleum Co. finished work on Drouin No. 1, sec. 26, 4N-2E.

After landing 299 ft. of 6⅝-inch liner, including 205 ft. of perforations at 4419, and blowing to clean the well out, a production test was made Feb. 13, during which the well blew 42,730,000 c. f. of gas through a one-inch bean. Casing pressure was 1614 pounds and pressure on the tubing was 1673. The well is now being blown daily preparatory to shutting it in. Shut in pressure was 1722 pounds.

Following the final work on Drouin No. 1, the crew will move over to Mayhood No. 1 which is scheduled to spud soon. This well is located 2480 ft. south and 1900 ft. east from the northwest corner of sec. 35, 4n-2e.

Western Gulf Still Swabbing Cantua Well

Western Gulf Oil Co. is swabbing S. P. Land No. 3, in Cantua Creek, located in sec. 3, 17-15. The bottom of the hole is at 8500 ft. Recent swabbing produced some water and sand with a trace of oil reported. It is understood that swabbing will continue, although the present outlook is not very encouraging.

C.G.N.A. Meets Mar. 4

The regular monthly meeting of the California Natural Gasoline Association will be held March 4 at the Mary Louise Tea Room, Barker Bros. The speaker of the evening will be Hugh Matier of the Union Oil Co. who will discuss "Hunting for Oil in the Land of the Pharoahs".

The Technical Committee, of which Walter Dayhuff, Standard Gasoline Co., is chairman, will present a progress report. The meeting opens at 6:30 p.m.

Los Angeles Basin

Barnsdall Saugus Well Has Industry Guessing

No well drilled in recent months has caused as much wild guessing on the part of the oil fraternity as has Barnsdall Oil Co. Rancho San Francisco No. 1, a wildcat situated about 6½ miles west of Saugus, on the Newhall anticline, in sec. 26, 4s-17w.

More than two weeks ago the company announced that the well's performance had convinced company officials that it had discovered a new oil field, and then information from the Barnsdall Oil Co.'s office abruptly ceased.

Not even Union's deep test in Santa Fe Springs, also a no-information project, has caused as much speculation as the amount of production, both present and potential, the well has uncovered. Due to the more or less isolated site of the discovery well, and to the company's practice of locking the gates a considerable distance from the drill site, Barnsdall has been peculiarly effective in suppressing information regarding activities there, whatever the reason for such silence may be.

Field reports indicate that about 140 ft. of 4¾-inch liner including 125 ft. of perforations was landed on bottom at 6276. The well was swabbed for several days and started flowing on Feb. 10. The gas flow was reported to be at the rate of about 5 to 6 million cu. ft., and the well was said to be producing about 100 to 200 bbls. per day of 50 gravity condensate, with pressure on the tubing about 75 pounds and about 1400 pounds on the casing. The gas was very wet.

Estimates of the well's production range everywhere from no oil to 2500 bbls. per day, with absolutely no confirmation from Barnsall on any of these reports.

Barnsdall states that at the present time the company is conducting production-practice experiments to determine the next step in developing the field.

Should it develop that the field reports are correct, then it is very likely that Barnsdall has drilled into the top of the formation, and beneath the cap and high gravity oil the company will probably uncover heavy oil. In this case the company will no doubt drill deeper into the structure to determine just what kind of a field the wildcat has found.

Barnsdall holds 6000 acres in the immediate vicinity, all leased from the Newhall Land and Farming Co. The company's holdings consist of three leases, one of 4000 and two others of 1000 acres each.

Barnsdall O'Dea Well Drilling At 7560 Ft.

Barnsdall Oil Co.'s deep test in Rosecrans, O'Dea No. 10, continues to drill ahead at 7560 ft. The well has had about 400 ft. of oil sand and shale. The well is being watched with considerable interest by other companies with property in the immediate neighborhood, for the discovery of productive sand below levels now being tapped would undoubtedly result in the deepening of many wells in the vicinity. The present deepest production in the field is about 6850 ft. Union, Tidewater Associated and General Petroleum hold nearby acreage, and Exeter Oil Co. has a 10-acre piece of ground a few hundred feet from O'Dea No. 10.

Shell Mathis No. 1, Anaheim, Down 2175

Shell Oil Co.'s wildcat located about one mile south of Anaheim in the northwest corner of sec. 23, 4S-10W, Mathis No. 1, is down 2175 ft. in sandy shale. The 9⅝-inch casing was set at 1099.

Ohio Gough 1 Near Completion At El Segundo

The next completion in El Segundo will probably be Ohio Oil Co.'s northern test, Gough No. 2. The well is bottomed at 7340 and Ohio is now running 6⅝-inch casing to set at 7270 ft. Gough No. 2 has a total of about 52 ft. of formation to draw from, as compared with Ohio Gough No. 1, which had about 63 ft. of productive formation.

Richfield

Richfield Oil Co. No. 2 is testing a water shut off at 7243 ft. The hole is bottomed at 7295. The company's El Segundo No. 4 is drilling through shale at 6978 ft., while No. 1 continues to flow 1613 bbls. of 27.3 gravity oil cutting 0.1% per day.

Caminol

Caminol Co. Ltd., No. 1 is down 7008 ft. in hard shale. No. 2 has reached 6572 ft. Republic Petroleum Co. No. 3 is drilling ahead at 7159, No. 4 is down 6286 ft. and No. 5 is bottomed at 4680 in shale.

Royalty Service

Royalty Service Corp. No. 1 is drilling at 6376 ft. in sand and shale. Union Oil Co. No. 1 is down 7261 ft., having made excellent time since it was spudded on Jan. 21.

The Texas Co.

The Texas Co. Johnson Two No. 1 is coring hard brown shale, with streaks of gray sand, at 7376 ft. Security No. 1 is down 5770 ft.

There will be a number of completions in this field in the next few weeks, for at the present time there are six wells drilling below 7000 ft. and four others that have passed the 6000 ft. level.

G. P. Completes New Well At Wilmington

The most important completion in recent days at Wilmington was General Petroleum Terminal No. 2, which was swabbed in Feb. 9 for an output of 2040 bbls. per day from a depth of 3600 ft., with perforated casing from 2940 to bottom.

The initial production of the well was 2040 bbls. of 18.4 gravity oil cutting 7% per day, flowing through a 5/8-inch bean. Tubing and casing pressures were 280 and 450 pounds respectively. A few days later the cut cleared to 1.6% and the gravity rose to 20.1, with the production running 2049 bbls. per day through the same bean. The bean was then cut down to 3/8-inch and at last reports the well was doing about 815 bbls. per day.

The company is grading location for Terminal No. 3, approximately 600 ft. west of No. 2, which in turn is about 400 ft. northwest of Terminal No. 1.

The casing collapsed in General Petroleum Patton No. 1 and the company drilled through the 8 5/8-inch casing at 3135 ft. and redrilled to 3600, landing 6 5/8-inch casing including 542 ft. of perforated at 3600. Sunday the well came in flowing for about 400 bbls. per day.

General Petroleum is rigging up Eubank Nos. 2 and 4 and Flint No. 1. Foundations are in for Ford No. 2 and the company is building rig for Ford No. 1.

Bankline Gets Wilmington Producer

The Wilmington area remains very active with new locations going in practically every day. Bankline Oil Co. completed Pacific Terminal Community No. 22 for an initial production of 250 bbls. per day. This has since risen to 277 bbls. of 20.0 gravity oil cutting 0.5% per day. The company spudded in Watson-Seven on Feb. 10. Location was also staked for Bankline's Tutor No. 1, approximately 150 ft. east and 150 ft. north of the corner of Anaheim Blvd. and Watson St.

Wilmington Oil & Development Co., of which Ira A. Marshall is president and D. W. Elliott is superintendent, spudded in a well Feb. 9. The location is about 150 ft. north and 100 ft. east from the corner of E and Sanford Streets. Mr. Elliott and Mr. Marshall are rigging up another located between Lecouvereur and Eubank, north of B Street.

Foundations In For Hall Wilmington Well

F. C. Hall had foundations in for a well to be drilled 140 ft. north and 140 ft. east from the corner of F and Sanford Streets. In Patton No. 1, drilled by the Pacific Western Oil Co. to 2955 ft., 11 3/4-inch casing was being run. The same company's Murphy No. 1 was standing cemented at 180 ft. where the 20-inch pipe had been set. The well was spudded Feb. 11, 1937.

Gauthier Spuds Second Wilmington Well

Gauthier Oil Co. spudded its No. 2 well Feb. 10. This well is located near State St. and the Los Angeles-Long Beach City boundary. Geo. F. Getty has three wells active in this area, with W-2 standing at 2940 ft. in shale and oil sand, a rig erected for W-3, and a location staked for W-4 at a point just north and east from F and Dominguez Streets.

Gilmore Oil Co. Jaite No. 1 continued to flow 396 bbls. of 16 gravity oil, cutting 3%. The company is driving piling for Well 842-1, located north and west of the corner of E and McFarland Streets.

Royalty Service Well Sands Up

Royalty Service Corp. Banning 21-5 No. 1, which was completed Feb. 5 for 450 bbls. of 16 gravity oil cutting 10% per day, recently sanded up and the company is now cleaning out. Three other Royalty Service wells are idle, awaiting a permit.

Selegna Associates, Inc. Silvaria-Locquier No. 1 is drilling ahead at 2060 ft., through sand and shale. Sovereign Oil Co. Advance Truck No. 3 topped the Miocene at 3617 and is now coring at 3810 ft. Union Pacific Railroad Co. Offset No. 1 is building rig. The drilling will be done by Hall-Baker. V. R. G. Wilbur is rigging up.

West Coast Refining Abandons Kramer Well

The West Coast Refining Co. has abandoned Yorba No. 1, located in the Kramer Area, in sec. 25, 3S-9w. The well was redrilled to 3420 ft. and was abandoned.

Abrams Redrilling Torrance No. 1

John M. Abrams & Associates, Inc. are redrilling at 2500 ft. in their Torrance No. 1. This was formerly Standard Oil Co. Potter Community No. 2, the total depth being 3640 ft.

Landers-Daly To Build Rig

Landers-Daly Oil Co., Martin O. Landers president, will begin immediate construction of the first derrick to be erected on their 12-acre lease between Redondo and Hermosa. It is understood that this property, which begins at the corner of Prospect and Anita, Redondo, is surrounded on three sides by restricted areas. The location of the first well will be at the corner of Paulina and Anita. The drilling will be supervised by Mr. Landers.

Salmond Heads C of C

For the second consecutive year, John Salmond, manager of Union Oil Co.'s Los Angeles refinery, has been elected president of the Wilmington Chamber of Commerce.

HOW'S YOUR I. Q.?

Here's a Good Way to Find Out, and at the Same Time

WIN A VALUABLE PRIZE!

Perhaps you already know the answers to most of the questions below, but if not there are plenty of clues given to help you win a useful prize. All answers can be found in the 1937 Composite Catalog, and in the Baker Catalog which we will gladly send to any oil man.

Any person employed in the Drilling or Production Branches of the Oil Industry is eligible. There is no entry fee—nothing to buy—no special knowledge is required. Just place a check mark opposite the answer you believe to be correct—or write your answer in the space provided. Then cut out this page along the dotted line and mail to the address below. Contest closes at midnight March 31, 1937, and no envelope postmarked after that time can be considered. You may win an extra prize for promptness—see details below.

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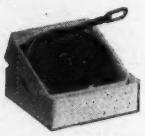

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LIST OF CORRECT ANSWERS Will be Published in the April 5, 1937, Issue of the Calif. Oil World. Send in your Answers promptly—then watch for this issue to check your I. Q.

Note: This contest is not open to persons residing in states where prize contests are not permitted by law. BUT IF YOU WANT TO TEST YOUR I. Q. go ahead and answer the questions and send in this page. WHETHER YOUR ANSWERS ARE RIGHT OR WRONG we will place your name on our list to receive for the rest of the year 1937 the little booklet called FRIENDLY CHAT, published monthly, which is full of stories, poems and quotations to give you a smile—to bring sunshine into dull days—to make you realize what friends should mean to you, and what your friendship means to others. This offer applies *only* if you live in a state whose laws *will not permit you to compete for prizes.*

ALL READY? . . . HERE ARE THE QUESTIONS!

CUT OFF ON DOTTED LINE AND MAIL TODAY!

1. What large Supply Company is celebrating its 75th Anniversary in 1937?

.....

2. The valve in a "Bakwik" Drill Pipe Float . . .

.....screws into the body
.....is held in place by the tool joint pin
.....locks into a tee-slot

3. Baker Kelly Straighteners operate by

.....steam pressure
.....leverage on a crow bar
.....hydraulic pressure

4. If drill pipe has been twisted off in a cave, what Baker Oil Tool would you find useful?

.....

5. The valve assembly in a Baker Cement Float Shoe is made of . . .

.....concrete .....bakelite
.....cast iron .....brass

6. Name three important uses for the Baker Model F Cement Retainer . . .

a. .....
b. .....
c. .....

7. Cement can be directed upward around the shoe and casing by using a . . .

.....Baker Cable Tool Core Barrel
.....Baker Cement Dump Bailer
.....Baker Cement Whirler Float Shoe
.....Baker Yungling Spiral Guide

8. Cores taken from extremely hard formations with a Baker Cable Tool Core Barrel usually are recovered in what form or shape?

.....

9. What is the purpose of the rubber ring in a Baker Cement Float Collar?

.....

10. If plastered rotary mud prevents a well from coming in easily, what Baker Oil Tool do you need?

.....

11. One of the many successful uses of a Baker Cement Retainer is to . . .

.....enlarge the hole before cementing
.....guide the overshot when fishing
.....straighten drill pipe
.....perform squeeze jobs

12. This core was taken from the side wall of an open hole by using a . . .

.....Baker Cable Tool Core Barrel
.....Baker Wall Hook
.....Baker Wall Sampler
.....Baker Whirler Cementing Collar with Basket

13. What Baker Oil Tool is used to cut formation as shown in this illustration?

.....

14. If you want to retain cement "tailings" inside the casing, what one of these Baker Tools would you use?

.....Baker Cement Retainer
.....Baker Cement Float Collar
.....Bakwik Drill Pipe Float
.....Baker Cleanout Bailer

15. This material was drilled out of a Baker Cement Float Shoe; what is it?

.....

16. The minimum reaming size of a No. 3-A Baker Wall Scraper is 5¾"—what is its maximum reaming size?

.....inches.

17. The valve ball in a Baker Cement Whirler Float Shoe is made of . . .

.....rubber .....cement
.....bakelite .....wood

18. The Canvas Basket Assembly on a Baker Whirler Collar serves to . . .

.....prevent blowouts
.....scrape off rotary mud
.....protect lower oil sands from cement

19. Baker uses concrete in all equipment for guiding, floating and cementing casing, because it is . . .

.....easy to drill up and circulate out of the hole
.....stronger than cast iron
.....cheaper than alloy steel

20. What color concrete is furnished in Baker Cement Equipment to determine the presence in "returns" of material drilled out of the shoe or collar?

.....

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I work for the.....**Oil Company**

My position is.....

My street address.....

City.....**State or County**.....

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Remember that the correct answers will be published in the Calif. Oil World of April 5, 1937—watch for it.

CUT OFF ON DOTTED LINE AND MAIL TODAY!

Coastal District

Calumet Coring In Shiells Canyon Well

In Shiells Canyon, sec 3, 3n-19w, Calumet Oil Co.'s No. 16 is coring ahead below 3395 ft. This well is an offset to Petroleum Securities Home Ranch No. 4 which was completed a few months ago at 3240 ft. Calumet's No. 16 is about 400 ft. from Home Ranch No. 4.

Calumet has 13 producing shallow wells in this area, with the holes bottomed between 2600 and 2800 ft. No. 16 is the first well drilled by Calumet to seek deeper production, and while the company reported 23 ft. of oil sand encountered at the completion level of the Petroleum Securities well, Calumet intends to carry the test further to see if still deeper production cannot be obtained.

In the same area, El Rancho Oil Co.'s Elkins No. 1, sec. 9, 3n-19w, is standing plugged at 4990 ft., with the hole bottomed at 5107.

Field Continental No. 1, Gato Ridge, To Pump

In Gato Ridge, O. C. Field Gasoline Corp. Continental No. 1 was scheduled to be put on the pump very shortly. The hole was drilled to 2812 ft. and 750 ft. of 7⅝-inch liner was run. Following acid treatment the company began bailing, and recovered some oil. Continental No. 1 is located in sec. 4, 8n-32w.

Barnsdall Oil Co. Tognazzini No. 9 was understood to have topped the monterey at 1722 and preparing to core. A rig is standing for No. 9. The Stewart-Carter well, sec. 4, 8n-32w, is drilling ahead at 2350 in oil sand. The Petrol Corp. Tognazzini No. 1A is still shut in and the company is grading locations for Tognazzini 2A and 3A.

G. P. Swabbing In Ferguson Well

After landing 121 ft. of 30 mesh 6⅝-inch liner, General Petroleum swabbed in Ferguson Permit 48-5 on Feb. 4. The well is in Rincon, sec. 7, 3n-24w, and came in for an initial production of 650 bbls. per day of 27 gravity oil cutting 9%. The total depth is 2828 ft, and the present production is 496 bbls. per day of 29.7 gravity oil cutting 0.7%.

In the Javon Area, sec. 23, 3n-24w, General Petroleum Padre No. 1 was swabbed and flowed by heads for three days. It was put on the pump on Feb. 2, sanded up and the company pulled rods and tubing and washed perforations. Put on the pump again on Feb. 6 it pumped for a while at the rate of 153 bbls. per day of 29.5 gravity oil cutting 3%. Since then it has been pumping irregularly, with present production about 233 bbls. per day, 20.1 gravity, cutting 7.3%.

Macrate Fernandez 1 To Make Production Test

A. N. Macrate was preparing to make a production test of Fernandez No. 1 early this week. This well is located in the northwest quarter of sec. 26, 10n-34w, about a mile and a half northwest of the Hancock-Bush California Lands No. 1.

Fernandez No. 1 is bottomed at 3970 ft., with 9⅝-inch casing set at 3320. Following a formation test at 3890 ft. it was determined to deepen the well to include as much of the productive Monterey formation as possible.

R. R. Bush Oil Co. Hopkins No. 1 was down to 1694 ft. and was running surface casing. W. D. Shaffer Houk No. 1 was down 5080 ft. in Monterey shale. Union Oil Co. Adam No. 2 was bottomed at 2717 ft. in shale, with 13¾-inch casing cemented at 1470. The company has a rig standing for Vincent No. 2, in sec. 30, 10n-33w.

Santa Maria To Get New Pipeline Outlet

Steadily mounting production at Santa Maria has caused the Union Oil Co. to plan construction of a pipe line to transport the heavy oil to tidewater.

Contrary to reports, the company is not building a complete new pipe line to the coast, but will construct a two-mile extension to connect with the existing line from Orcutt to Avila, where the ship loading station is located. The old loading station was at Port San Luis, about two miles from Avila, but Port San Luis was abandoned and all oil from Midway, Kern River, Kettleman Hills and other valley points is sent through lines which converge at Avila.

The new construction will include, in addition to the two miles of new line, a small station at Santa Maria and a booster station at Summit, which is the half-way point. Gathering lines in the field and certain incidental equipment will also be necessary, of course. Because of the oil's low gravity, it will be heated to thin it sufficiently for transportation through the line. The present line from Orcutt to Avila is eight inches in diameter.

Construction is planned to start in about two weeks, with completion date set for May 1, 1937. The cost is expected to approximate $220,000.

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Doing Another . . . . "It Can't Be Done"

Nothing challenges the modern operator more than a chance to prove wrong the fellow who has said "It can't be done!"

There must have been a lot of that sort of daring, along with good business judgment that dictated the drilling of Hobbs Petroleum Co.'s Bass and Goodnight Well No. 6 on Brayton Avenue adjoining the Haas Lease of the Richfield Oil Co. on Signal Hill.

One; the fact that this lease measures 30 ft. in width and is 150 ft. long, certainly puts it somewhere in the category of the "world's smallest" lease. In any event, it's mighty hard to get the necessary equipment: pipe racks, slush pits, drainage ditches, etc., on so small a space; to say nothing of the danger of encroaching on the other fellow's property "down under" somewhere, when a variation of only 16 ft. either way would put you off you own property and onto the other fellow's. Then, there was ever present the possibility of "crossing up" with some one of the surrounding wells —many drilled before the present accumulation of scientific data regarding straight hole drilling.

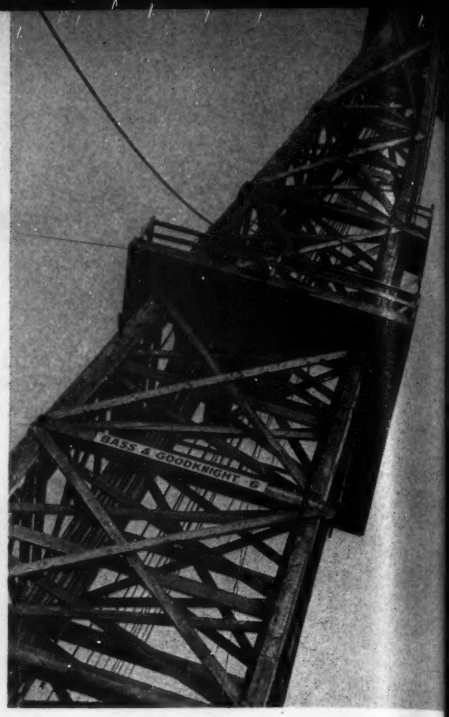
Two; the lease is closely surrounded on all four sides by numerous wells, many good old-time producers. Therefore, it's "finicky" business drilling a well into such well drained sands.

Notwithstanding all these known factors, the officials of the Hobbs Petroleum Co. determined to drill this well and upon the advice of their consulting geologist, F. E. G. Berry, charted for production in the "C" zone of the Wilbur sands. Based on known geologic data, it was determined that this zone would be encountered at approximately 2900 ft. and that it should be approximately 32 to 35 ft. in thickness.

Careful attention to every detail was the order of the day, from derrick foundations throughout the entire setting up of rig and drilling of the hole. Spudded in on Dec. 25 with a 17-inch H. C. Smith rock bit, 590 ft. of 17-inch hole was made in 2 days and with one set of cutters. This hole was surveyed each 100 ft, and an accurate log was kept as to exact position of the bottom of the hole from true perpendicularity. In consequence, when 590 ft. of 11¾-inch, 60-pound casing had been set and cemented solid, the hole was found to be only 2.88 ft. north and 2.43 ft. east of perpendicular.

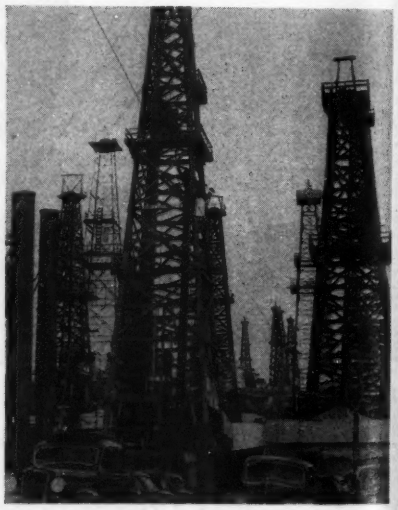
Pipe stood cemented two days, after which time a 10⅝-inch rock bit was run and used continuously to 2932 ft. This hole was drilled in 19 days and required six sets of cutters. During this time 25 additional surveys were made as each additional 100 ft. of hole was made. From 2725 ft. to bottom, a 7⅝-inch core bit was used, coring ahead and then reaming out to full 10⅝-inch gauge with a rock bit.

When 2932 ft. of 7-inch casing was set and cemented, it was found that the hole was 4½ ft. north and 5½ ft. east of true perpendicular.



A crooked picture of a straight hole.

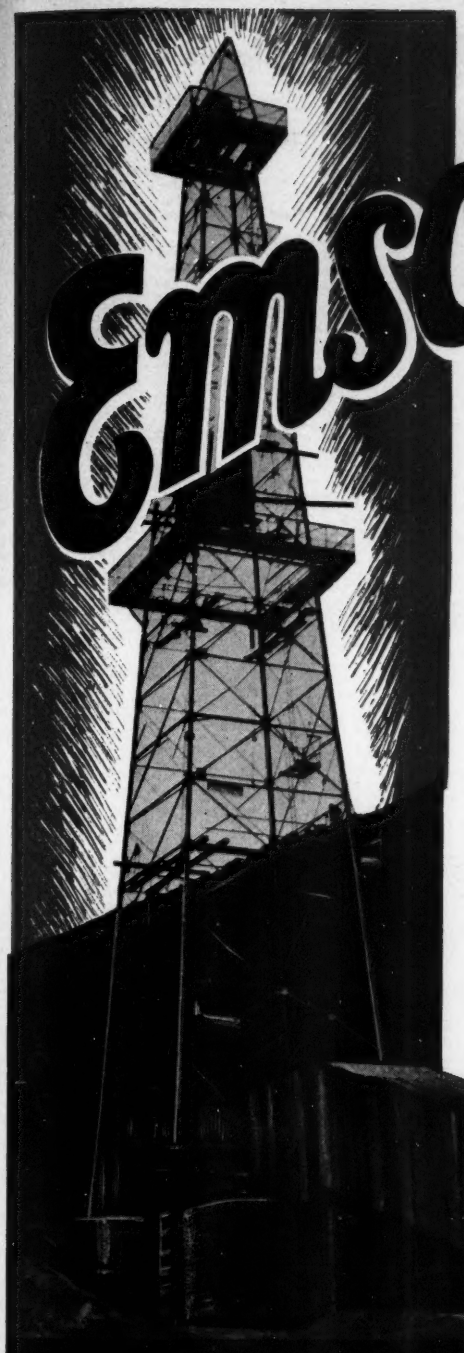
Formation consisted of sharp sand, sandy shale and tough shale, all of which could be more quickly and easily drilled with a rock bit than with any other type bit.



Close quarters.

According to Charlie Colvin, general superintendent of the Hobbs Petroleum Co., three factors, in the main, were responsible for the almost true perpendicularity of the hole: A rock bit on the bottom of the hole at all times, never crowded by excessive weight; constancy of weight and speed of rotation, and perfectly conditioned mud circulating under high pressure.

Charles Colvin, superintendent; Newton T. Bass, president; E. J. Garner, vice-president; Logan Goodknight, secretary-treasurer.



Emsco again

HELPS MAKE A WORLD RECORD

Emsco rotary equipment has been used for drilling the world's four deepest wells, the latest one being Associated Division of the Tide Water Associated Oil Company's McGonigle No. 12 at Ventura, California — now the world's deepest producing well. Emsco units used on this well:

EMSCO DERRICK
EMSCO DRAW WORKS
EMSCO ROTARY
EMSCO SWIVEL
EMSCO TRAVELING BLOCK
EMSCO CROWN BLOCK

Emsco advanced equipment and portable units are continuously setting new standards of safety, efficiency and economy, and are entirely dependable for drilling to any required depth.

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EMSCO DERRICK & EQUIPMENT COMPANY

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All Emsco Machinery and D + E Products Sold Exclusively in Mid-Continent Fields By The Continental Supply Company. Export Office: Continental Emsco Co., 30 Rockefeller Plaza, New York, New York. Foreign Office and Plant: Emsco Engineering Co., Ltd., St. Albans, Herts, England.

State Drilling Report

Field	Company	Well No.	Sec.	Twp.	Range
NEW WELLS					
Wilmington	Royalty Service Corp.	Community 2	5	5 S	13 W
	V. R. G. Wilbur	Mutual 1	33	4 S	13 W
	Geo. F. Getty, Inc.	W 3	33	4 S	13 W
	General Pet. Corp.	Eubank 2 & 4	5	5 S	13 W
	General Pet. Corp.	Flint 1	33	4 S	13 W
	Pacific Western Oil Corp.	Murphy 1	33	4 S	13 W
	Bankline Oil Co.	Classification Yds. 1	34	4 S	13 W
	Elliott & Marshall	Mouche 1	33	4 S	13 W
	Selegna Assoc. Inc.	Silveria-Locquier 1	33	4 S	13 W
Montebello	Union Oil Co.	La Merced 26	1	2 S	12 W
Inglewood	Standard Oil Co.	L. A. Invest. Lease 82	8	2 S	14 W
Whittier	Partridge & Chambers	7	22	2 S	11 W
Torrance	Swyer Oil Co.	Swyer 1	16	4 S	14 W
	Two and One Oil Co. Ltd.	Two and One 6	16	4 S	14 W
	Calmore Oil Co.	C. O. C. 6	6	4 S	14 W
Ventura	Tidewater Associated	Lloyd 137	26	3 N	23 W
Seepe	H. A. Ivers	14	1	4 N	20 W
Santa Maria	R. R. Bush Oil Co.	Hancock-Bush-Hopkins 1	30	10 N	33 W
Cat Canyon	Stewart Carter Oil Co.	Burton 1	4	8 N	32 W
	Barnsdall Oil Co.	Tognassini 9	9	8 N	32 W
Sunset	The Hancock Oil Co.	Maricopa 5	8	11 N	23 W
	Oil Incorporated	O 3	7	11 N	23 W
	Iroquis Oil Co.	1	7	11 N	23 W
	5 Points Pet. Co.	Lease 2 4	18	11 N	23 W
Midway	Standard Oil Co.	52 & 79	33	32 S	24 E
	Richfield Oil Co.	Fellows 12	6	32 S	23 E
	Quality Oil Co.	Bull 4 & 5	22	32 S	23 E
	Quality Oil Co.	W. P. 5	27	32 S	23 E
	North American Oil Cons.	5	2	32 S	24 E
	The Texas Co.	18	32	32 S	24 E
Fruitvale	Harry H. Magee	Douglass 1	23	29 S	27 E
	Trico Oil & Gas Co.	Knowles 2	23	29 S	27 E
	Meridian Oil Co.	Turner 2	23	29 S	27 E
Belridge	Belridge Oil Co.	21–1	1	28 S	20 E
	Belridge Oil Co.	24–35	35	27 S	20 E
Mountain View	Vesta Petroleum Co.	Vesta 11	19	30 S	29 E
	Hogan Petroleum Co.	Symons-C.C.M.O. 4	4	31 S	29 E
	Hogan Petroleum Co.	Wharton 8	32	30 S	29 E
	Liko Petroleum Corp.	1	19	30 S	29 E
Kern River	Standard Oil Co.	Ward Fee 3	24	28 S	27 E
Kettleman North	KNDA	63	34	21 S	17 E
Long Beach	Yunker Oil Co. Ltd.	6	29	4 S	12 W
Piru	Pacific Western Oil	Temescal 10	4	4 N	18 W
Bardsdale	Union Oil Co.	Robertson 16	12	3 N	20 W
Kern County	Continental Oil Co.	K. C. L. B-1	12	29 S	26 E
Solano County	Amerada Pet. Corp.	Mayhood 1	35	4 N	2 E
Kings County	Cent. Cal. Util. Corp.	Kettleman-Lakeview 3	11	23 S	19 E
San Joaquin County	Coast Exploration Co.	TF 1-1	2	3 S	4 E
DEEPEN OR REDRILL					
Torrance	Imperial Gypsum & Oil	McDowell Comm. 1	35	3 S	14 W
	John M. Abrams & Assoc.	Torrance 1	16	4 S	14 W
	Superior Oil Co.	Torrance 38	19	4 S	13 W
	C. C. M. O. Co.	Del Amo 15	16	4 S	14 W
	Weber-Butler Oil Co.	Gilman 1	16	4 S	14 W
Huntington Beach	James O. Reed	4	2	6 S	11 W
Santa Fe Springs	The Texas Co.	Matern Two 3	6	3 S	11 W
Long Beach	Winslow Oil Co.	Winslow 1	19	4 S	12 W
	The Texas Co.	Moore 2	19	4 S	12 W
	Richfield Oil Co.	Green 2	29	4 S	12 W
	M. A. Cox	Shotliff 1	13	4 S	13 W
	Union Oil Co.	Long Beach Comm. 13	30	4 S	12 W
Domingues	Shell Oil Co.	Reyes 74	33	3 S	13 W
Elwood	Pacific Western Oil Corp.	92–12 & 92–11	16	4 N	29 W
	Barnsdall Oil Co.	Doty 7	15	4 N	29 W
Sunset	The Hancock Oil Co.	Maricopa 1 & 2	8	11 N	23 W
Coalinga	Inca Oil Co.	23	24	20 S	14 E
	Standard Oil Co.	73	35	19 S	15 E
Montebello	St. Helens Pet. Co.	Piuma-Briano 6	6	2 S	11 W
Inglewood	Standard Oil Co.	Baldwin-Cienega 26	8	2 S	14 W
Ventura	Tidewater Associated	Lloyd 125	23	3 N	23 W
Santa Barbara County	Nine Springs Oil Co.	1	10	7 N	30 W
Kern County	Ohio Oil Co.	Kern Co. Land Co. A-1	32	31 S	26 E
ABANDON					
Long Beach	Continental Properties	Bixby 1	29	4 S	12 W
	The State Co.	Dell 3	19	4 S	12 W
Playa Del Rey	Banks & Hansmeyer	Wood 1	28	2 S	15 W
Newport	Nuoil Co.	3	29	6 S	10 W
Coyote Hills	V. R. G. Wilbur	Ward-Johnston 1	20	3 S	9 W
Edison	Shell Oil Co.	21-Comm. 1	21	30 S	29 E
Mt. Poso	Ring Oil Co., Ltd.	Knapp 2	28	26 S	28 E
Fruitvale	I. J. Banducci	Ticehurst 1	26	29 S	27 E
Stanislaus Co.	Oakdale Oil Corp. Ltd.	1	3	2 S	10 E
Santa Fe Springs	Tidewater Assoc.	Clarke 21	1	3 S	12 W
Los Angeles County	So. Cal. Drill Co.	Burkhard 1	2	5 S	14 W
Huntington Beach	R. O. & W. Oil Co.	Jackie Coogan 3	2	6 S	11 W
Seal Beach	Herley Supply Co.	Parr 1	3	5 S	12 W
Ventura	Shell Oil Co.	Edison 12	28	3 N	23 W
Mesa	Anacapa Oil Co.	Lowe 4	28	4 N	27 W
	Amy B. Rust	Anchordoquy 1	28	4 N	27 W
	Drake Oil Co.	Nye 1	28	4 N	27 W
Santa Barbara County	Tidewater Associated	Edwards Estate 1	2	4 N	30 W
Midway	Richfield Oil Co.	Fellows 8	6	32 S	23 E
Round Mountain	Calif. Western Oil Co.	22	7	28 S	29 E

Summary	Last Two Weeks	Previous Two Weeks	To Date This Year	To Date Last Year
Total New Wells	51	47	141	96
Total Deepened or Redrilled	25	21	73	75
Total Abandoned	20	20	58	54

California Crude Oil Production

Two Weeks Ending February 17

Field	February Daily Quota	Average Daily Production	Excess
San Joaquin Valley	DAILY AVERAGE		
Beldridge—North	12,570	14,941	2,371
Beldridge—South	1,965	1,818	*147
Buena Vista	16,880	17,090	210
Coalinga—East	11,650	11,508	*142
Coalinga—West	5,320	5,566	246
Coffee Canyon	5,315	4,988	*327
Edison	4,865	4,895	30
Elk Hills	8,030	8,618	588
Fruitvale	8,280	8,527	247
Greeley	445	369	*76
Kern Front	10,375	10,089	*286
Kern River	3,645	2,387	*1,258
Kettleman No. Dome	77,150	77,703	553
Lake View	3,220	12,057	8,837
Lost Hills	4,210	3,788	*422
McKittrick	3,660	1,659	*2,001
Midway-Mariposa	35,465	38,472	3,007
Mount Poso	15,745	17,470	1,725
Mountain View	20,505	21,095	590
Round Mountain	6,955	6,853	*102
Ten Section	655	1,000	345
Other Fields	3,040	2,834	*206
TOTALS	259,945	273,727	13,782
Coastal District			
Elwood	9,670	9,650	*20
Rincon	1,865	2,294	429
Santa Maria	5,945	6,405	460
Santa Paula-Newhall	4,335	5,154	819
Ventura Avenue	29,870	33,652	3,783
Other Fields	4,475	5,921	1,446
TOTALS	56,160	63,076	6,916
Los Angeles Basin			
Alamitos Heights	1,485	1,584	99
Brea-Olinda	7,920	7,964	44
Coyote—East	2,370	2,995	625
Coyote—West	7,720	6,759	*961
Dominguez	23,075	23,566	491
El Segundo	585	2,020	1,435
Huntington Beach—New	18,450	20,290	1,840
Huntington Beach—Old	14,260	15,665	1,405
Inglewood	12,935	12,264	*671
Long Beach	59,195	62,550	3,355
Montebello-Extension	8,385	9,653	1,268
Playa Del Rey	10,190	10,222	32
Richfield	7,170	7,275	105
Rosecrans-Athens	1,965	2,180	215
Santa Fe Springs	41,050	44,394	3,344
Seal Beach	7,265	8,380	1,115
Torrance-Hermosa and Extension	7,250	7,891	641
Wilmington	1,295	1,721	426
Other Fields	2,155	2,129	*26
TOTALS	234,720	249,502	14,782
STATE TOTAL	551,000	586,305	35,305

*—Shortage.

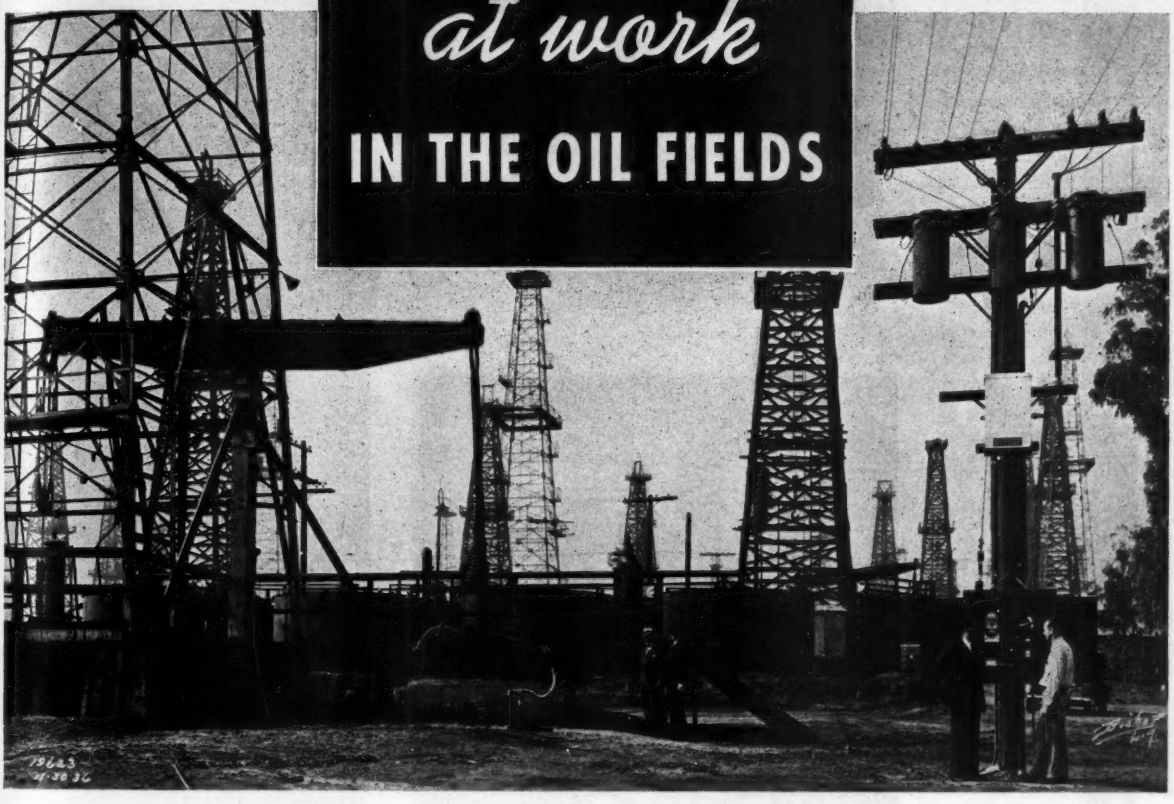
Californians Enter Colorado

Midwest Drilling and Development Co., headed by California oil men including Bernard H. Scott, former general manager of Continental Oil Co. and Charles E. Cooper, Signal Hill operator, have invaded Colorado near Grand Junction. They plan a test to below 3500 ft.

The field has been a shallow zone producer for years, but the Sundance and Ten Sleep sands have been proved up in Wyoming to the north, indicating that a deep test will revive the field.

Electricity at work

IN THE OIL FIELDS



An electric pumping plant on Signal Hill, Long Beach

ELECTRIC PUMPING INSURES AGAINST "SHUTDOWNS"

Day in, day out, the silent, dependable electric pumping plant does its job without fuss, without annoyance from shutdowns and repairs. The fact that there is practically no maintenance expense assures an extremely low production cost per barrel of oil delivered. Recent installations at Signal Hill and Huntington Beach reveal some interesting data which has been charted at the right.

If power is available in your field, it will pay you to investigate electric pumping. Just call your Edison office.

Bbls.	% Cut	Depth	Stroke	H. P.	Average Monthly Electric Bill
150	40%	2600	18	5	$22.00
75	25%	2700	15	5	21.50
55	30%	4350	13	5	24.00
20	5%	3000	18	7½	21.00
79	10%	2700	18	7½	25.00
25	2%	7024	17	10	32.00
55	12%	5000	14	15	41.00

SOUTHERN CALIFORNIA EDISON COMPANY LTD.

2-37

JOHNSTON *win* 3

1

CALIFORNIA COURTS

The District Court of the United States for the Southern District of California, Northern Division in a suit brought by Erle P. Halliburton and Halliburton Oil Well Cementing Company against M. O. Johnston Oil Field Service Corporation et al in its Decree entered on the 23rd day of October, 1936, held that the Johnston Formation and Casing Testers DO NOT INFRINGE the Simmons Patent (the patent in suit) and DISMISSED the said suit.

2

TEXAS COURTS

The United States Circuit Court of Appeals for the Fifth Circuit, in a suit brought by Erle P. Halliburton and Halliburton Oil Well Cementing Company against Johnston Formation Testing Corporation et al in its decision of the 9th day of January 1937, held that the Johnston Formation and Casing Testers DO NOT INFRINGE the Simmons Patent (the patent in suit) and DIRECTED the lower court to dismiss the suit.

WHY SET CASING

TESTERS decisions!

5 REASONS FOR OPERATORS' PREFERENCE

THE TRIP VALVE, an exclusive feature fully covered by patents, assures the operator that any fluid contained in the drill pipe after a test has been made is an accurate sample of the contents of the formation tested.
It also differentiates between a test and a drill pipe leak.

"ACCURACY IS PARAMOUNT"

THE EQUALIZING VALVE, another exclusive feature fully patented, eliminates the dangerous pull which would otherwise be present when lifting the packer from its seat.
It equalizes the unbalanced pressures above and below the packer before lifting it.

"SAFETY COMES FIRST"

ACCURATE DEPTH PRESSURE RECORDERS are run as a regular part of the Johnston Formation Testing Service.
All recorders are checked regularly in our modern Calibrating Laboratory.

"A GAUGE IS NO BETTER THAN ITS CALIBRATION"

SERVICE. The Johnston Formation Tester is serviced and handled by experienced well men who know Formation Testing.

"WE'RE THERE WHEN WE'RE NEEDED"

FULL PROTECTION. The Johnston Formation Tester is covered by the following U. S. Letters Patents:
1,709,940 1,842,270
1,715,504 1,901,813
1,790,424 Other Pats. Pend.

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Numerous operators throughout the world made decision to avail themselves of e service offered by the Johnton testing tool, which tool, in eir opinion, functions with the reatest possible safety and furishes them with the information ey desire.

is decision was made prior to e decision of any court and opators have at all times consistntly adhered to it.

o those operators we wish to xpress our sincere appreciation r their support and co-operaon and to pledge even better rvice and results in the future.

JOHNSTON TESTERS ARE NOW AVAILABLE IN THE MIDCONTINENT

We are pleased to announce that the Johnston Formation Tester is now available on the Gulf Coast. This service will be rendered by the Johnston Oil Field Service Corporation (a Texas corporation) with principal offices at 131 Harvard Street, Houston, Texas. In the near future, service branches of this company will be established throughout the major oil centers of the midcontinent to efficiently meet a growing demand for Johnston service.

SIGNED:

Johnston Oil Field Service Corporation

131 HARVARD ST., HOUSTON, TEX.

BORE YOU KNOW

M. O. JOHNSTON
OIL FIELD
SERVICE CORP

3117 San Fernando Roa
Los Angeles, Cali

PHONES: Los Angeles AL 0181
Bakersfield 2794, Ventura 56

Shell Co. Martinez Pipeline Parallels Former Facilities

By F. B. Simms
Superintendent of Pipelines
Shell Oil Co.

Complete job, including laterals, 312.16 miles long. Construction time, from engineering work to completion, seven months, with cost $4,500,000.

The history of Shell pipe lines in the San Joaquin Valley began in 1914, when the company built a line to transport Coalinga crude to its new refinery at Martinez. This line was a pioneer in the method of transporting heavy, viscous crudes with the aid of heat.

After 22 years this line is still in operation with the original pipe, still using the same pumping equipment, and to a large extent, still the same auxiliary equipment.

For over a decade following completion of the line Shell's attention was turned to other fields of production, most important of which was Signal Hill, which it discovered.

In the San Joaquin Valley, Shell discovered the Mt. Poso field, acquired large holdings in the Round Mountain and Kettleman Hills fields, discovered Mountain View and developed the Edison field.

The company had no pipe line in this area at that time and the Coalinga-Martinez line was already taxed to capacity. When Ten Section field was discovered last year the need for an additional line became really urgent. So Shell's new Bakersfield-Martinez pipe line, capable of meeting present and future requirements, including a central tank farm and a system of lateral lines, was laid down and work started.

Complete New Line

This new main pipe line was a complete and separate system designed to work in conjunction with the existing line built in 1914 between Coalinga and the Martinez refinery. The new system required the construction of four pump stations between Bakersfield and Coalinga and mechanical additions to the existing six pump stations between Coalinga and Martinez.

Four lateral lines were constructed as a part of the project: an 8-inch line from the Mt. Poso field, 12.29 miles long; a 6-inch and 8-inch line, 9.28 miles long, from the Round Mountain field; an 8-inch line, 17.21 miles long, from Shell's newly discovered Ten Section field; a 6-inch line, 20.6 miles long, from the Mountain View-Edison area. All terminated at a central tank farm.

The new main line from Bakersfield tank farm via Caliola pump station near Coalinga, to Martinez, is 257.98 miles long and consists of 189.54 miles of 10-inch pipe and 68.44 miles of 12-inch pipe.

The old, or existing line, from Caliola pump station and tank farm to Martinez refinery consists of 140 miles of 8-inch pipe and 30 miles of 10-inch pipe. The new main line parallels the existing line from Caliola pump station to Martinez refinery, utilizing second line rights obtained at the time the original line was built, thereby greatly reducing the amount of new right of way to be acquired.

The route selected for the line was the shortest distance between Bakersfield tank farm and Caliola, consideration being given to other areas of production to which lateral pipe line connections might be made in the future, and other important engineering considerations such as avoidance of improved agricultural lands, ease of transportation and feasibility of construction.

Pipeline's Course

Leaving Bakersfield, the line takes a general northwesterly course, passing near the Lost Hills and Kettleman Hills oil fields to Caliola, and through Kern, Kings and into Fresno County. From Caliola to Martinez the general course is still northwesterly, passing through Fresno, Merced, Stanislaus, San Joaquin, Alameda and Contra Costa counties.

From Bakersfield to Shell's Merval pump station in Merced County, a distance of approximately 155 miles, the line passes through a generally unimproved plains country. From Merval pump station northwesterly to the Meganos pump station, in Contra Costa County, a distance of approximately 75 miles, the route passes through dry farming country, growing mostly wheat and bar-

ley. At Meganos pump station mountainous terrain is encountered near the eastern slopes of the Mt. Diablo range, where the highest elevation on the pipe line system is reached, approximately 1000 feet above sea level, and 15 miles southeasterly from the Martinez refinery. At this point the line passes through highly improved vineyard and orchard country, and drops down to practically sea level at the refinery.

All engineering, designing, surveys, selection and purchase of materials and inspection was done by Shell Oil Company under supervision of the company's chief field engineer, J. R. Gignoux. Actual construction was performed under contract.

Time Records

Outstanding performance was by the general contractors, Lindgren & Swinerton, who completed the laying of the new main pipe line and laterals (312.16 miles in all) in the remarkable time of 90 days. They also completed the four new pump stations and made additions to the other six in a similar period of time.

No serious accidents occurred to mar the record. Naturally, a few accidents of a minor nature took place, but in handling over 26,000 tons of pipe from Los Angeles and Stockton harbors, over highway and railroad, and stringing it by truck along the predetermined 316-mile course, nothing untoward occurred, nor was a single highway traffic accident reported. This good record continued through the erection of the new pump stations and all other phases of the work.

H. C. Price, Inc., of Bartlesville, Okla., performed all welding operations on the project under the personal supervision of Mr. Price, whose crews made their first weld on July 22, 1936, on the main line, and the last firing line weld on October 21 at a point near Meganos pump station in Contra Costa County. Possibly the statement that the welding contractors made the last weld is inaccurate if we remember that the last, or "golden weld," was made, with appropriate ceremonies, by Shell's president, S. Belither, with the assistance of his manufacturing and marketing vice presidents, C. H. Van Senden and W. P. Durkee.

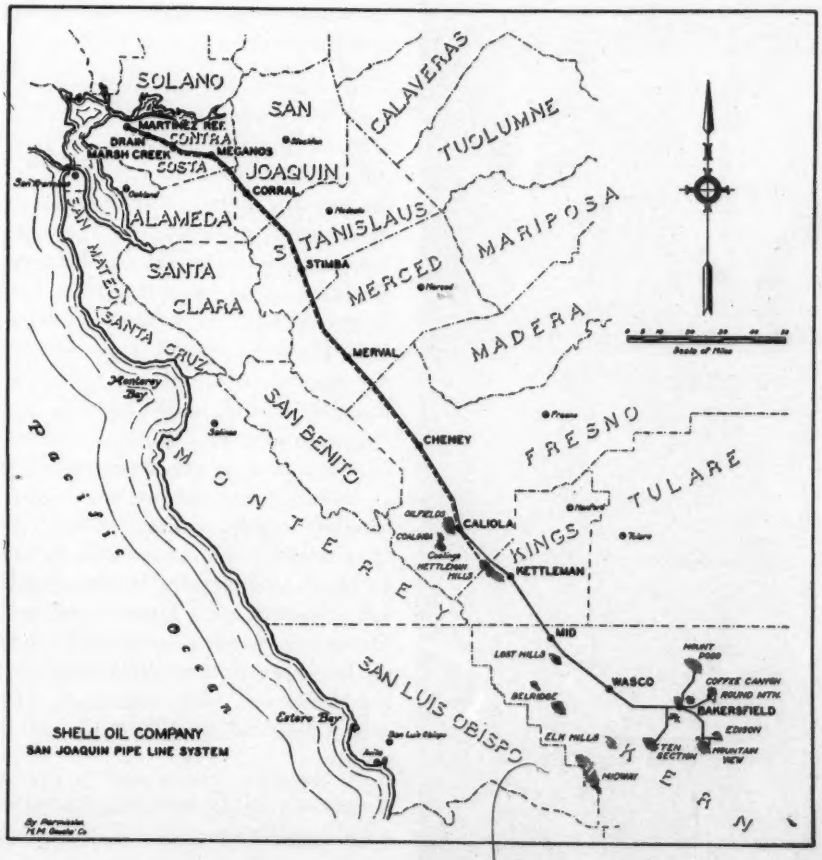
The new system, including all laterals, was then thoroughly flushed with water previously accumulated in Bakersfield tank farm and pressure tested, the new main line pumps being used for this purpose. No leaks were found in the entire 316 miles of line.

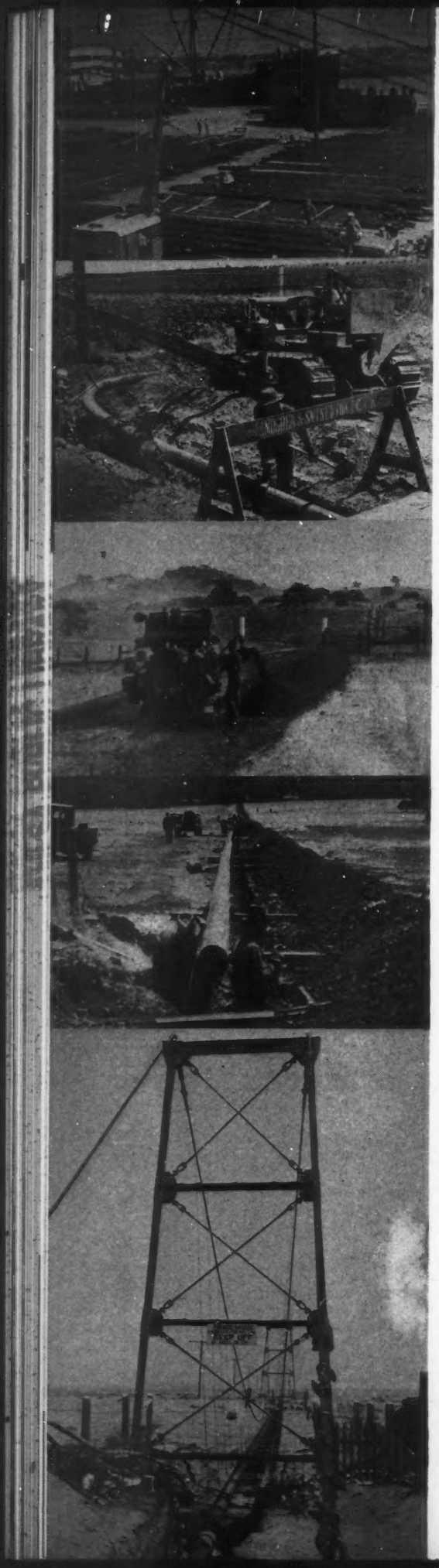
At 8:00 a. m. on December 20 oil was started for the first time through the line from Bakersfield tank farm. The head of this oil arrived at the end of its journey at 5:15 p. m. on December 27 and a continuous stream of Bakersfield crude has been flowing to Martinez refinery ever since.

In designing this project, Shell's engineers had to plan a system that would be elastic enough to economically transport oils of various grades ranging from the lowest to the highest gravities. However, the most viscous oil was the controlling factor and the line was designed to operate most economically under full load moving the heaviest oils under extreme winter conditions and in order to do this it was necessary to provide a so-called hot oil line.

These conditions resulted in the selection of a 10-inch pipe line leaving each pump station, the diameter increasing to 12 inches about two-thirds of the pumping distance to the next station.

In laying the main and lateral lines contractors used modern equipment throughout. Sufficient side boom tractors of the caterpillar type, ditching machines and other necessary equipment which included forty arc welding machines, were supplied to outfit four complete con-





Pipeline construction scenes.

struction crews working simultaneously on different sections of the line. Original points along the line from which these four crews started were Bakersfield (all laterals), Bakersfield pump station, Meganos to Martinez. All crews finished surprisingly close together in the matter of time. The best day's run of any crew during the progress of this work was 5.25 miles of 10-inch line completely tied in. The daily average for all four crews was 3.51 miles of completed line.

State highways and railroads crossed, bored and cased, together with county road and irrigation canal crossings counted totalled seventy-eight.

In addition to these seventy-eight crossings, two passages of the Kern River were made; one on the Ten Section lateral, the other on the Mountain View lateral. These were made in the orthodox manner; that is, river clamps were installed over each joint and bowed upstream to insure permanent burial under the river bed.

Two suspension-type bridge crossings were necessary. The first is across Big Panoche Creek north of the Cheney pump station. This bridge was built in 1914 to accommodate the existing pipe line with ample provision for taking additional lines. The second, across Los Banos Creek, two miles north of Merval pump station, is of similar design and was built as a part of the new line. It is 260 feet long between suspension towers. Approved expansion joints were installed at each of these suspension bridges. Similar expansion joints were included on the line where it is exposed to the elements for a distance of 150 feet or more. These expansion joints have proved necessary to hot oil line operation, entirely eliminating difficulties from expansion and contraction of the line at these points.

Expansion joints were also installed on the discharge side of all pump stations to protect station manifold and yard piping against undue strain from expansion or contraction.

The proper selection of pump station locations and the equipment to be used in those stations required careful consideration. On the section of line from Caliola to Martinez it was decided to use the existing crank and flywheel type of steam driven plunger pumps as the main pumping units for the hot oil.

Additional oil heaters were installed at existing pump stations plus an additional boiler, and some minor changes were made in the auxiliary equipment, station piping, etc.

It remained, then, to determine the proper lengths of 10 and 12-inch line to meet the conditions of pressure and temperature losses between the pump stations.

In the Caliola-Martinez sector of the system there are two parallel pipe lines: the old, or existing combination 8 and 10-inch line, and the new combination 10 and 12-inch line. The former is operated as a constant temperature light oil line.

Boiler Equipment

In order to move efficiently the greatly increased amount of oil going through these two systems there was installed at each of the six existing stations (Caliola, Cheney, Merval, Stimba, Corral and Meganos) one 237.5 hp. Heine type longitudinal riveted drum steam boiler without superheaters. Each of these boilers was installed in separate settings and fitted with a 38-inch diameter, 130-foot welded smoke stack. The existing smoke boxes and stacks were insufficient to serve the new boiler installation. Each new boiler was equipped with Peabody type M combination gas and oil burners.

In conjunction with this new boiler installation, gas burner rings were also provided for the old Heine type

boilers and fuel gas provided at all six stations instead of fuel oil which had previously been used.

As existing old-style oil heaters were inadequate, three new heaters were installed at each of the stations. They consisted of two 48-inch diameter by 20-foot tube-length, low-pressure heaters, each having 6225 square feet of heating surface; and one high-pressure heater, 26-inch diameter by 18-foot tube-length, with 1422 square feet of heating surface.

A 720-barrel, 40-foot high floating tank is connected to the suction line between the outgoing side of the heater group and the pumps, thus insuring flooded conditions in both heaters and pump suctions. The incoming hot oil is connected directly to the cold side of the heater group.

Pumping Equipment

There was also installed at each of the stations on the Caliola-Martinez sector a Byron-Jackson 4-inch by 6-inch-stage O. L. multiplex centrifugal pump, directly connected to a 390 hp. Westinghouse steam turbine. This unit is capable of delivering 1200 barrels per hour against 800 pounds line pressure and is so connected that it maye be operated on either of the two lines on either hot or cold oil. This latter feature also applies to the crank and fly wheel unit and the existing Jeannesville straight line plunger pump, which will be maintained as a standby for the other two main pumping units at each of the six stations.

As the design of the original pumping and heating facilities provided for raising the temperature of a smaller quantity of oil to a maximum temperature of 140 degrees, whereas the new line requirements were based on an operating temperature of 180 degrees, with a greater quantity of oil to be transported, the steam turbine driven centrifugal pumps are calculated to provide the necessary additional exhaust steam to maintain thermal balance on the hot oil side while actually these pumps are moving cold oil.

Pumping station construction scenes.

The originally installed heaters remain connected through a small floating tank and are used to maintain a constant low temperature on all oils moving through the original light oil or cold line from Caliola to Martinez.

Small structural additions to each of the pump buildings were made, also a vast amount of changes to the suction discharge and auxiliary piping. All of this work was accomplished with the existing line in operation except for three shut-downs —two for 12-hour periods, the third for 30 hours.

The four new pump stations (Bakersfield, Wasco, Mid and Kettleman) on the Bakersfield-Caliola sector are, in most respects, identical and equipped with the finest equipment available.

As previously stated, they are designed to handle a peak capacity load of 1200 barrels per hour of the heaviest crude at 180 degrees temperature against 1000 pounds pressure under extreme winter conditions.

To accomplish this each station is provided with three Ingersoll-Rand 4-stage, 6-inch centrifugal pumps driven by a 350 hp. Moore steam turbine. Steam is supplied by three 237.5 hp. Heine type boilers furnished by Combustion Engineering Co., Inc., equipped with superheaters operating at 200 pounds pressure and 100 degrees superheat.

Each boiler is equipped with gas and oil burners, similar to those previously described on the Caliola-Martinez sector, and a single smoke stack, 54 inches in diameter by 130 feet high.

Auxiliary Equipment

Auxiliary equipment includes two Ingersoll-Rand 2-stage, 80 gpm., 275-pound pressure, centrifugal boil-

er feed pumps and two 80 gpm., 70-foot head, feed water heater supply pumps, mounted on common base, together with their steam turbine drivers. These operate in conjunction with an Elliott de-aereating feed water heater having a heating capacity of 30,000 pounds of water per hour from 140 to 219 degrees F. Feed water regulators control boiler feed.

A 7x5x10-inch duplex steam driven pump is provided for general utility service and a 2½-inch centrifugal pump with a capacity of 300 gpm. against total pressure of 150 pounds, driven by a General Electric 47 hp. steam turbine, is provided as a fire pump.

A fuel oil burner pump and heater set manufactured by Coen is provided to supply the boilers when operating on oil.

The above described principal equipment on the four new stations, Bakersfield-Caliola, is housed in four structural steel frame, corrugated iron buildings, 59 feet by 100 feet long.

The boilers and all auxiliaries are separated from the main pump room by a fireproof wall. A small office is so located that an operator has clear vision of both main pump and boiler room compartments. In this office the main gauge and instrument board is installed. An instrument board is also mounted in each of the main pump and boiler compartments upon which indicating gauges, particularly adapted to controlling the equipment in each of those compartments, is mounted.

Main oil heaters in all respects similar to those installed on the Caliola-Martinez sector are used at these four stations. The heaters are installed outside each main building and are provided with a raised platform, or catwalk, to make accessible all valves and fixtures.

In order that the greatest fuel economies would be realized in the operation of these plants, auxiliary equipment was provided so that during periods of exhaust steam surplus not required for raising or maintaining the temperature of the oil being pumped, the entire plant may be operated full condensing. This is accomplished by use of a jet-type air pump capable of maintaining a high vacuum on the main oil heaters and an automatically controlled, electrically driven condensate pump.

Appropriate drain sump and hot well facilities are provided outside the building and wherever possible piping is placed above ground or in open trenches. Inside the main building all piping is exposed in concrete trenches having steel floorplate covers.

Direct Connections

At the Wasco, Mid and Kettleman stations no floating tanks are provided. The incoming stream of oil is directly connected to the main pump suction so arranged that the oil may be diverted directly to the pumps without passing through the heaters, or vice versa. The main pump steam turbines are equipped with pressure governors so regulated that a back pressure is maintained on the oil heaters or suction sufficient to insure flooded suction conditions and automatic regulation of pump output in step with the upstream station, Bakersfield pump station output being manually controlled.

Wasco, Mid and Kettleman stations are each equipped with two 15,000-barrel A.P.I. steel service tanks; two 1000-barrel steel water storage tanks and two 144-barrel steel fuel oil storage tanks.

At Bakersfield pump station there are two 144-barrel fuel oil storage tanks and two 1500-barrel, steel water tanks, the latter serving the tank farm, the pump station and the new office building and camp, which were also recently constructed and put into operation.

New Tank Farm

Because of the obvious necessity of collecting ahead and temporarily storing the crude coming in from the laterals, a complete and new tank farm was erected, strategically located some five miles north of Bakersfield.

At the tank farm six 68,000-barrel A.P.I., 102-foot diameter, eight rings high, welded bottom, riveted shell and welded cone roofed tanks were erected; also two 60,000-barrel tanks of similar specifications except that these two were equipped with Wiggins pontoon roofs. This made a total gross storage at Bakersfield tank farm of 544,000 barrels.

The tank farm site is so situated on gently sloping ground that the tanks provide a suitable gravity head on the pump station which is connected to the tanks through a large diameter suction pipe system, inclining gently upwards to the tank farm.

At Caliola tank farm two 68,000-barrel pontoon roof equipped tanks were added to the existing storage at that point which consisted of seventeen 55,000-barrel steel tanks erected in 1914.

A suitable supply of good water was obtained at Bakersfield, Wasco and Mid from water wells drilled on or near the pump station site. These water wells are equipped with submersible electric motor driven pumps, automatically controlled.

At Kettleman station water was obtained from a local water company.

The elapsed time taken for the engineering, design, purchase and delivery of equipment, hauling, erection and construction on the project was slightly more than seven months. The number of men working was approximately 500. The cost involved was slightly in excess of $4,500,000.

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LAUGH THIS OFF

According to **Torrey Webb,** when a pedestrian and an automobile meet at a street crossing now-a-days, it's just a toss up.

He consequently advises all and sundry, when using the crosswalks, to watch the oncoming cars. Look towards the traffic stream on the near side of the road while you walk, and when you pass the middle, turn your head and watch the reverse stream. If you make a business of jay-walking angle-wise over the road, with your back to at least one half of the traffic, it's a cinch an automobile will get you in the end.

And in the same connection, when anyone asks **Art Wallace** what kind of mileage he's getting now, he proudly proclaims that he is doing more than twenty miles to the fender.

Joe Scanlon chips in with a yarn about a certain nameless oil man of the Fillmore district, who recently attended a banquet at Ventura and dined not wisely but too well. Returning home just before dawn, he tiptoed in the front door, and floundered around with outstretched arms, feeling for some familiar object to give him his bearings. He found it soon enough—the goldfish bowl. As it crashed to the floor, his wife called from the bedroom, "Bill, what on earth are you doing?" Bill replied somewhat truculently, and with great presence of mind, "Well, no goldfish is gonna snap at me and get away with it."

One of the most conscientious drivers in California is **Johnny Kline.** It may be all baloney, but we have been told that once on an extended northern trip he forgot to change his oil at the proper speedometer reading, and drove back over 800 miles to correct his mistake.

And this conversation, if we are to believe **Roy Fry,** emanated from an oil company boarding house: 1st Rousty: "Hey there, what's the big idea wearin' my slicker?" 2nd Rousty: "Well, you wouldn't want to get your suit ruined in this rain, would ya?"

R. A. Broomfield, on the other hand, declares that he picked up this classic in Chinatown, San Francisco. In any case he sends it along in another of his frequent efforts to upset our equanimity. "If a Chinaman went to the dentist," he asks, as cool as a summer day in the bay city, "what time would it be?" You'd never guess the answer in a mililon years, so rustle out your smelling salts while we give you the lowdown. "Tooth hurty," is the precise moment. Isn't that a honey, or something.

Bill Durkee, by the way, is firmly convinced that dentists were the very first to use portable drawworks.

Personally, we are just bored to tears in their presence.

It is interesting to note, however, that, like petroleum technologists, they are now specializing more and more in particular phases of their business. Going up to a dental parlor (they should call them drawing rooms) a few days ago, we were ushered into the torture chamber to face the chief executioner. "Doc," says we, "there's a molar here that's gotta come out." "Sorry," sez he, "but you'll have to go to somebody else. I just extract bicuspids."

It looked for a while as if we were going to have an early spring this year. **W. L. McLaine** thought he saw a robin on the lawn a few mornings ago, but it turned out to be just a sparrow with high blood pressure.

Examining another possibility for the oil industry, **"Happy" Yowell** asked, "How long have you been out of work?" "I really don't know," answered the applicant, "to tell the truth, I can't find my birth certificate."

"Holly" Hayter to the contrary, we have been definitely assured that large shipments of shatter-proof glass are now being forwarded to Scotland for the manufacture of engagement rings.

And **Neil Needham** is working on a device that will ring an alarm 15 minutes before the fire starts, so that the fire brigade will be on hand to tackle it before it goes too far.

Cy Bell, who is usually right, definitely believes that the only way to stop sleeping sickness is to adjourn the meeting.

However, when **Frank Rheem** remarked to one of the Shell boys down at Dominguez a short time ago that the girls in Compton were certainly pulchritudinous, the fellow gasped for a minute, and then he says, "Aw, what's the difference, so long as they are good looking?"

We have one of our secret operatives investigating a rumor to the effect that a certian rig-builder offered his blood for a transfusion, and that the doctors in the case refused it because they were afraid the patient would freeze to death.

New Method of Controlling Boiler Feed-Water Levels

WRITTEN ESPECIALLY FOR CALIFORNIA OIL WORLD

By J. A. Campbell
Natural Gas Engineer

A more sensitive feed-water level controller results in almost exact control of boiler water levels, with resultant economies in fuel consumption and a better control of output.

The development engineer has a real obligation to fulfill. He must commercialize his work, of course, unless he has a Santa Claus to back him; and most Santa Clauses expect, sooner or later, a return on their investments. He must put out equipment for which there is a demand and on which he can realize sufficient profit to meet his immediate needs and to carry on further research and development.

To render a real service to the community he must not direct his energies merely to marketing competitive equipment. Nor can he depend solely on advertising and high-pressure salesmanship to put his products across. It is necessary for him to go forth and look for problems and, having found them, to confine his efforts to developing equipment for which there is an actual need.

Influenced by our own observation, as well as by reports from our many friends and acquaintances in the oil industry, we were convinced that the proper control of boiler feed-water presented a pressing problem.

As the basic principle of our design, we adopted the inclined thermostatic tube, primarily because of the latent power available for the motivation of the feed-water valve. This power is restricted only by the elastic limit of the metal utilized. Many regulations employing this principle had been put on the market. The first thing to do, then, was to study their weaknesses in order that they might be obviated in the new design. Since the effectiveness of a thermostatic tube depends on its terminal temperature difference, the initial step was to install a simple tube, equip it with thermometers and determine what this difference was. Such a tube, 42 inches in length, with a slope of 1 to 12, was set up, with the water level cutting its mid point. The boiler was of 50 horse power, operating at a pressure of 145 pounds, carrying a 3½" level in a 12-inch gauge-glass. The average temperatures, taken hourly over a 72-hour period, were 356° at top of tube and 268° at bottom.

Temperature Difference Low

This 88° difference seemed surprisingly low, and accounted for the poor performance of this type of regulator. Just why was this difference so slight? There are two reasons: First, the steam lead coming down from the top of the column is usually uninsulated, and being a small line, permits concentration of a considerable amount of steam. The resulting hot water has no path to follow other than down through the thermostatic tube. As a consequence, the lower end heats up. Second, the steam in the vapor end of the tube heats it very hot, and, since brass is an excellent conductor, this heat is transmitted to the lower end. The only offsetting factor to nullify this tendency of the lower end of the tube to heat up is the small amount of radiation from the tube's surface.

As our first move, in an effort to correct this condition, we designed an upper end-casting with a catch-pocket underneath, and ran a copper tube from this drip entirely around the thermostatic tube, connecting it with the water return at the lower end. This hot by-pass dropped the temperature of the lower end of the tube 31° F. Encouraged by this marked improvement, and observing that the level now stayed within the range of the middle 16 inches, we decided to drain the upper 12 inches of the tube. This reserve, which is normally filled with steam, condenses a considerable quantity of hot water. By cutting in a drip-pocket 12 inches down and connecting it to our hot by-pass, we gained another 19 degrees. However, the lower end was still running hot, owing to the conductivity from the steam. We attempted to cut off this transfer by inserting an insulating flange about 14" from the lower end. The results were rather disappointing, in that the terminal temperature was lowered only 11 degrees. It was difficult to find any material for the gasket with a low coefficient of heat transfer, yet possessing sufficient mechanical strength to be safe. Abandoning the idea of cutting off this heat, we decided to dissipate it by the application of fins to the lower section.

Fins

This idea called for considerable experimentation with different types and diameters of fins and with variation in their spacing. The thickness of the metal has a decided bearing on radiation. One must compromise between thinness and mechanical strength. We finally developed a very thin fin, corrugated to meet strength requirements. Obviously, the heat-dissipating surface was materially increased.

The first experiments in finning brought forth some surprising discoveries. The concluding experiments resulted in a fin so spaced as to lower the terminal temperature

another 100 degrees F. We now had a tube two and a half times as sensitive as the simple brass pipe.

As regards the action of the fins: when the regulator is properly set, it will be observed that, as the level drops on the gauge-glass, all the water will run out of the tube before the level is down out of sight. This draining fills the entire tube, including the finned sections, with steam. The radiation from the fins releases large quantities of latent heat, which heat the tubes very hot. This heating causes an extreme opening of the valve, thus making it impossible to burn a boiler, so long as water is available at the proper differential.

Cantilever Principle

Having, through the application of fins, attained our objective in heat differential, we next began to consider a method of applying this force to feed-water valve motivation. The cantilever principle offers two decided advantages. First, it permits considerable multiplication of the length changes depending on the ratio of spread of the two members to their length and the translation of this multiplied length change into vertical movement. Second, there is the increment in exposed or flooded tube length which one gets by raising or lowering the tube.

We adopted 42 inches as the tube length, and fixed the slope at 1 to 12. The spread is such as to give a multiplication of 8.

The next problem was to determine by experiment the proper type and style of valve to use in the feed-water line. After trying out various types, we finally decided on a single-seated, bevel-disc lever valve. This valve gives a positive shut-off and, in this respect, is preferable to a balanced valve, because the latter, to shut off perfectly, must be adjusted to a rather narrow range of feed-water temperature. As to size, we have found the very small valve most effective. The reason for this is apparent. Regulators in which the valve stem is attached directly to the tube can open the valve an amount only as great as the actual expansion in the tube. Since this amount is only a few thousandths of an inch, a relatively large valve must be used in order to secure enough peripheral opening to permit passage of the required amount of water. The high velocity through this narrow slot is conducive to wire-drawing and scoring of the valve and seat. When bad water conditions obtain, there is danger of complete stoppage through liming up. With thermal efficiency increased to over 2½ and a mechanical advantage of 8 through utilization of the cantilever principle, the new controller has more than twenty times as much movement available for valve operation. Consequently we can employ a much smaller valve, and can open it to a considerable extent. A half-inch single-seated valve is ample for feeding a 150-horse-power boiler with a 20-pound differential; that is, with 20 pounds greater pressure on the pump discharge than that shown on the boiler pressure gauge.

The body size of the valve however, should not be less than one inch. There are two reasons for this. First, small piping to the valve is not sufficiently rigid, so is likely to give. In giving, it introduces lost motion between the thermostat and the valve. This lessens sensitivity. Second, a ½" valve in a 1½" or 2" line looks out of proportion and takes a lot of explaining. However, anyone with experience in hand-firing a boiler knows that it takes only a few notches on the wheel to meet the full steaming requirements when a full-line size valve is used, and veteran firemen often install a ¼" or ⅜" globe throttle as a by-pass around the feed valve for fine adjustment. With a 25-pound differential, a ½" single-seated valve, open 1/16", will pass sufficient water to meet the full load on a 150-horse-power boiler; and with sufficient movement to open it ⅜", an ample factor of safety is provided.

When we had completed the development work and had a regulator with which we were satisfied, we built nine and installed them on the boilers of a gasoline plant under the writer's supervision. Levels were set at 3" in the glasses; and, with no other changes in the plant or in the field to account for it, the extraction increased one tenth of a gallon, or 1200 gallons per day. These nine regulators have effected savings in water, fuel, and pump maintenance. The steam output of the boilers is steadier than it has ever been, as is evidenced by the almost perfect circles recorded on all of the operating charts.

Setting The Regulator

Of the several operations incident to installing a regulator, the most important, perhaps, is getting it properly set. This does not present any problem on the H. R. T. or water-tube boilers, since they are always equipped with water columns. But the locomotive type, or fire-box boiler as it is called in the oil fields, since it has no column, constitutes a special case. Its gauge-glass fittings tap the boiler shell above the crown sheet through the head. For some unexplained reason, somebody started the practice of tapping in the return line for water regulators down on the side of the water leg. This is the case with most of the field boilers that have ever been equipped with regulators. This tap-in is often as much as 20 inches lower than the lower gauge glass fitting. Sometimes this tap-in is in the front, but usually from 10 to 18 inches lower than it should be. The improper location of this tap has, to a large extent, been responsible for the poor performance of the thermostatic controllers on fire-box boilers. Assuming that this water return is tapped-in 20 inches below the bottom gauge glass fittings and that the gauge shows the levels to be 3" in the glass, if the boiler is steaming heavily, the froth level in the boiler is approximately one inch

higher. The water in the boiler is full of bubbles of steam and is frothed up about 20% higher than the stable balancing column in the gauge-glass. Now if we tap in at a point 24 inches below the level of the gauge-glass and run a line up inside the boiler and connect it with the steam space, the level in this line would be five inches below the level inside the boiler.

If, in view of this 5-inch drop, we set our regulator as we would for an H. R. T., where the water column and the controller each have the same connections, when the boiler was steaming heavily, the water would draw down entirely out of the tube, opening the feed valve wide; and it would not shut off until the water was out of sight above the top of the upper fitting. The only remedy for a case like this is to set the regulator 5 inches low. But then the level in the tube, provided the load varies, will run over a wide range, even assuming it remained constant in the boiler gauge. Such a condition makes for poor control, even with a good regulator. For steady level control the water return should tap into the boiler at the same level as the lower gauge-glass fitting.

Mathematics Involved

Now let us check into the mathematics involved, since this reveals some very interesting facts. To gather these data there was set up the latest improved model of the controller on a 150-horse-power H. R. T. boiler. Just one half inch below the middle of the tube a thermometer well was brazed in, a great deal of bronze being used to get a true tube temperature, rather than the contents temperature. Three inches below this point was a similar thermometer well, and one at each end of the tube. A 42-inch gauge-glass was connected in, running the full length of the tube, with the fittings tapping into the two end-castings.

The first readings were taken with the level at 3½" in the boiler gauge-glass, which brought the level in the inclined long glass at the exact center, or one half inch above the upper of the two intermediate thermometers.

The temperatures of the four thermometers, reading down from the upper end-casting, were 358°, 297°, and 147°. All temperatures are Fahrenheit.

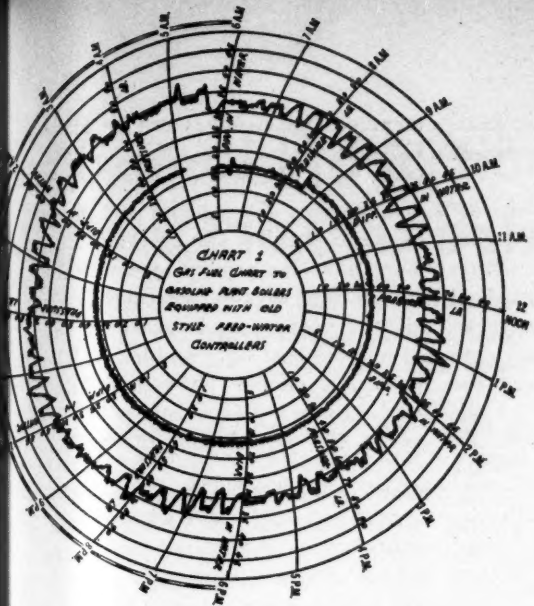
Next, the control valve was adjusted so as to drop the level exactly three inches in the inclined glass. Since the slope is 1 in 12, this should drop the level in the boiler one-quarter inch. But it does not, however. When the end-casting rises, the slope is increased. This increase causes the level to drop farther down the tube. The reverse occurs on a rising level, which flattens the slope and causes the water to run out further, and so cool more of the tube than would be exposed by a fixed slope. This is a decided advantage of the cantilever design, and is one of the reasons why it was adopted. Since our intermediate thermometers were spaced just three inches apart, dropping the level in the tube three inches brings the lower end of the thermometer into the same relative position to the water level as the other occupied at the three-inch higher level.

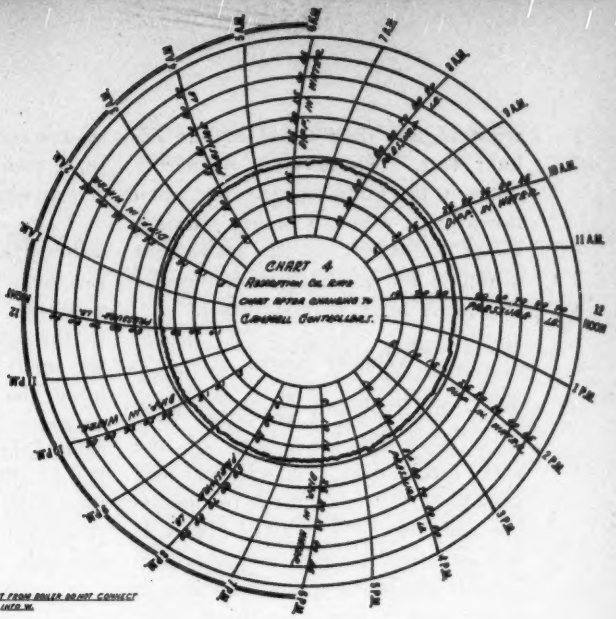
Now we take our readings, and get, respectively, 358°, 324°, 288°, and 160°. From these two sets of figures we learn that the arithmetical mean average increase in temperature of the three inches uncovered by the water and exposed to steam was only 23.5°, and the mean rise for the lower 18 inches of the tube, which in both cases was filled with water, is 16.5°, and for the top 21 inches, which in both cases was filled with steam, is 13.5°. The coefficient of expansion of the tube material is .0000105. Multiplying out, we find the actual expansion of the three sections in inches, and in the foregoing order, to be .00074-025, .00311850, and .00297675. The total of these is .0068350, or a trifle less than .007 of an inch. Since this .0068350 of an inch is multiplied by 8, through cantilever action, the end-casting moves up eight times this amount, or .05468 of an inch. Now, raising the end of the tube .05468 of an inch will raise the tube at water level 18/42 of this amount, which will cause the water to run down the tube approximately a quarter of an inch. So, had we lowered our level in the boiler glass ¼", we should have exposed 3¼" of tube to the steam and should have increased our total movement by 1/12, up to approximately .06", or a little less than 1/16". As nearly as we can measure this actual amount, it is 1/16" for ¼" change in boiler level.

Any slight discrepancy here is easily accounted for by the fact that the true mean temperatures are not arithmetical means, and our slope increment changes the slope ratio, thus calling for a slight correction. The difference is so slight, however, that for all practical purposes the mathematics is valid as it stands.

It probably is a surprise to most boiler operators to learn that only a little more than 10% of this expansion occurs in the three inches which changed from a water contact to a steam contact. It was a surprise to the writer to learn that the tube temperature as much as three inches below the water level was so high. This is the effect of conductivity. Another interesting observation is that on checking the second set of readings, we see that the upper of the intermediate thermometers, even though measuring tube temperatures three inches above the water level at a point where you would expect the steam to be up to full saturation temperature, records a temperature 34° lower than the steam temperature in the end-casting, and this latter is not even to saturation temperature. This is a result of heat dissipation through conductivity.

It will be noted that our lower-end temperatures in this series are some-





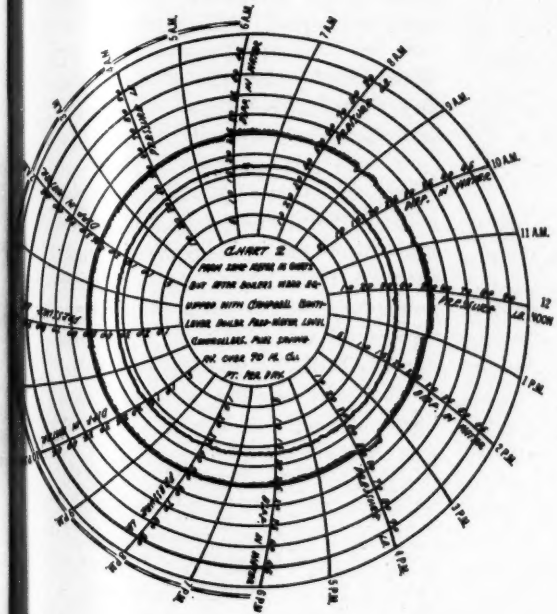
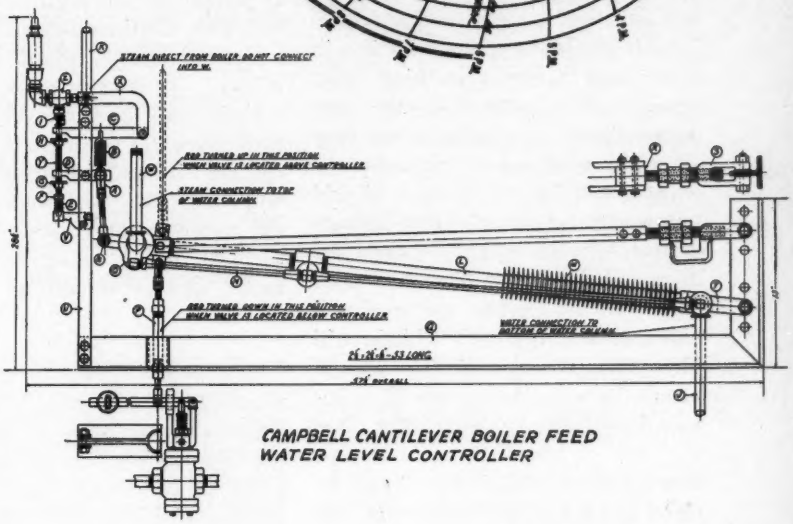
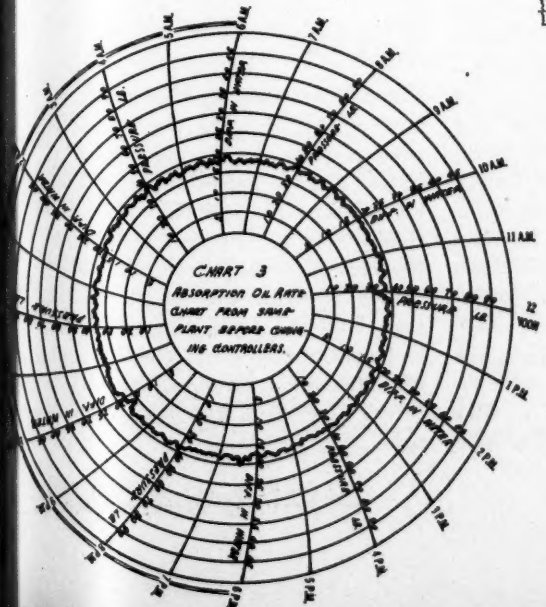
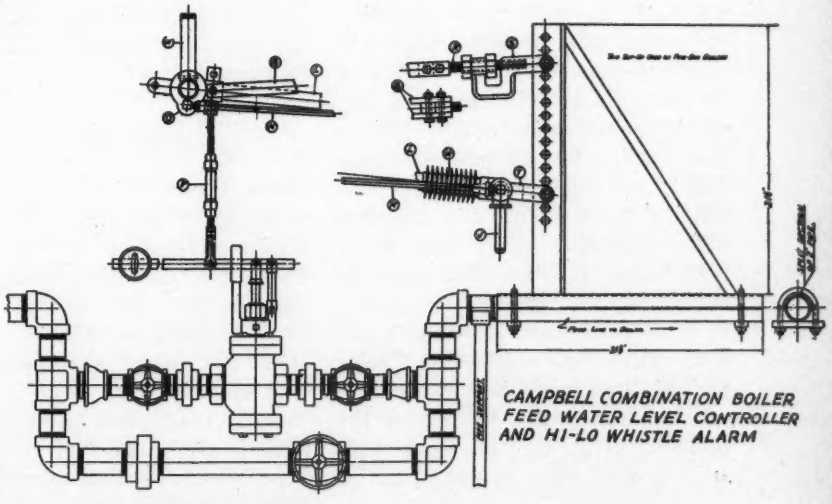


CHART 2
FROM THIS CHART IT WILL BE SEEN THAT AFTER BOILERS WERE EQUIPPED WITH CAMPBELL CANTILEVER BOILER FEED-WATER LEVEL CONTROLLERS, FUEL SAVING OF OVER 10 PER CENT. RESULTED.

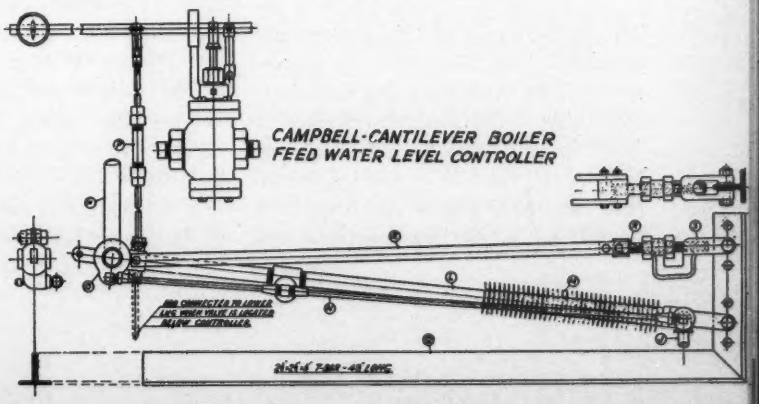

STEAM DIRECT FROM BOILER DO NOT CONNECT INTO W.
ROD TURNED UP IN THIS POSITION WHEN VALVE IS LOCATED ABOVE CONTROLLER
STEAM CONNECTION TO TOP OF WATER COLUMN
ROD TURNED DOWN IN THIS POSITION WHEN VALVE IS LOCATED BELOW CONTROLLER
WATER CONNECTION TO BOTTOM OF WATER COLUMN
24"
10"

CAMPBELL CANTILEVER BOILER FEED WATER LEVEL CONTROLLER





CAMPBELL COMBINATION BOILER FEED WATER LEVEL CONTROLLER AND HI-LO WHISTLE ALARM



CAMPBELL-CANTILEVER BOILER FEED WATER LEVEL CONTROLLER

what higher than those in our 72-hour test. These were purposely taken in the middle of the day when it was hot, with no breeze stirring, so as to determine the movement available for valve operation under the most adverse conditions.

Whistle Alarm

After developing a regulator with such potential movement of the valve mechanism, it was logical that we utilize this movement in operating a high-and-low whistle alarm. If you can hold a very constant level in your gauge-glass, the whistle will blow only when something goes wrong. For instance, if the feed pump should lose suction or stop through mechanical failure, the whistle will blow for low. Should pump packing, or any other foreign matter, become caught between the discs and the seat of the valve so as to prevent its closing, the level will build up and the high whistle will blow, Since these conditions are unusual, the whistle may not blow for months or years at a time.

The simple mechanics we have devised permits the setting of the valve trips so close that a variation of a half-inch from normal will sound the whistle. Also they may be set so as to be independent, permitting more variation on one than on the other. The adjustment is very simple, and is fixed by setting a jam-nut. Equipped with this device, a boiler will whistle for high water long before the level has gone up sufficiently to produce wet steam. It can be adjusted to whistle for low, with only a slight drop below normal, thus affording the attendant an opportunity to correct the difficulty before he loses sight of his level in the bottom gauge.

The advantages of this system are apparent. It is fool-proof; movement of the operating mechanism is inevitable if the water level rises or falls in the tube; by-passing or completely removing the level control valve still leaves the whistle in operation; all parts are outside, and so are accessible at all times; finally, a complete range of adjustment is provided.

When the alarm is installed, steam for the whistle must be taken from a source other than the steam lead to the controller. Otherwise, even the small flow of steam necessary to blow the whistle will reduce the pressure in the upper end of the tube, and the full boiler pressure below will force the water up the thermostatic tube and chill it off. If whistling for high, the whistle will blow continuously and keep the water valve shut off till the boiler is dry. If whistling for low, the whistle will give one short blast, then the water will rush up the tube, chilling it and shutting off the whistle. This performance allows the water to run back and the tube to heat up, blowing the whistle again, and repeatedly at short intervals.

This source of steam for the whistle should be from a point in the boiler shell or water column, slightly below the connection in the whistle head, so as to drain back any condensate to the boiler. Otherwise, a small slug of hot water may shoot out when the whistle valve is first opened.

Light System

When a rotary is in operation, it would be hard to hear even a locomotive whistle from the derrick floor. This condition prompted the signaling by means of lights. Two small Mercoid switches are mounted adjustably on the lower whistle arm. The electric leads from these on each of the boilers in the drilling battery are connected to a three-wire system running to the derrick floor. Here two vapor-proof lights are mounted, a red one for low water, and a blue one for high water. If any one of the boilers develops low water, the red bulb lights. If any one runs high, the blue light goes on. With this system the driller has a complete check on boiler performance. The adjustment on the switches can be made independent of the whistle, either more or less sensitive. With this arrangement the whistle and most of the mechanism can be eliminated, since only one arm is necessary for the tilting of the Mercoids. Or electric horns may be used, or any combination of light and horns. The power, a simple 110-volt lighting lead, can be cut in at any point between the derrick and the boilers.

Many companies at times use their boiler man on the derrick floor. Under these drilling conditions an alarm system of the type just described—and it can't help working as long as the current is on—is a great help. Moreover, it is good boiler insurance.

Provision is made for checking, at any time, performance of both the whistle and the electric signaling.

There are many applications for the controller other than in boiler-feed regulation. It is being used in replacing steam traps for discharging condensed steam from evaporators and stabilizer reboilers. This condensate is discharged at a rate equal to that of formation, and no steam blows through.

This regulator is advantageously used for liquid-level control in any location where, above the liquid, there is a hot gaseous component capable of heating the upper end of the working tube. It is especially suited for maintaining a level in stabilizers or reboilers, and is much more sensitive and more positive than a float.

Another outstanding application we have made, utilizing the cantilever principle but eliminating the fin, is controlling the gas fire under a small retort in a continuous oil-reconditioning plant. In this installation the entire oil flow from the retort passes through the length of the tube, and the multiplied expansion and contraction effect closely regulates the temperature of the oil entering the small fractionating column.

National Production Totals 1,098,516,000 Bbls. In 1936

Production 90,000,000 bbls. more than in best previous year. Imports at 1935 level, but increased demand causes withdrawal of 26,710,000 bbls. from stocks.

National production for 1936 totaled 1,098,516,000 bbls. (U.S.B.M. figures), or **90,000,000 bbls. more than the yield of 1929,** the highest previously recorded. The year's production of natural gasoline totaled 42,041,000 bbls., against 1935's 39,333,000. Production of benzol came to 2,537,000 bbls., against 1,871,000 bbls. during 1935. **The grand total of new domestic production thus ran up to 1,143,094,000 bbls., an increase of 104,296,000 over 1935.** However, even this big supply was so short of the demand that even imports of 32,327,000 bbls. of foreign crude, almost identical with 1935's imports, failed to make up the difference and the stocks of refinable crude were reduced during the year by 26,671,000 bbls., and amounted to 288,184,000 bbls. Dec. 31, 1936.

From the above figures it is clear that, **in the face of the greatest production of crude of any year in our history, the supply was short of demand by 58,998,000 bbls. Total 1936 demand for refinable crude came to 1,157,514,000 bbls., an average of 3,162,607 bbls. per day; daily production of crude to 3,001,409 bbls.** In other words, **1936 demand for crude oil exceeded the domestic supply by 162,198 bbls. per day.** The figures are for 366 days, for 1936 was a leap year.

The significance of the above figures will be plainer when it is noted that during 1929, the year with the next biggest production, storage was increased, not diminished as it was last year.

Total supply of all oil, crude and refined, including natural gasoline, on Dec. 31, 1936, came to 518,433,000 bbls., **equal to only 155 days' supply at the year's current rate of demand and to only 146 days' supply, nine days less, at the December rate.** The figures show that the rate of demand is increasing.

December Crude Data

December, 1936, daily average production rose to a new record of 3,150,100 bbls., 116,200 higher than the average in November and 59,900 above the previous record of October.

Daily average production in Texas in December was 1,229,000 bbls., or close to 70,000 higher than in November. All Texas major districts showed increased production, with new highs being recorded in many fields. That part of the Rodessa field which is in Texas, and in which most of the drilling is now being done, produced at the rate of 11,400 bbls. daily. Daily average production in Oklahoma was 605,400 bbls., the highest since 1933. All of the major districts except Seminole registered gains. California's output again showed little change but Louisiana, Kansas, and New Mexico, which rank next in importance, all established new records. Although the total initial of the new wells in Oklahoma increased, field work generally slackened off, hence the gain in December was due principally to an easing of restrictions.

Although daily average crude runs climbed back to just about 3,000,000 bbls., the large gain in production was reflected in the trend of crude stocks which declined at the rate of just over 25,000 bbls. daily compared with withdrawals of more than 100,000 daily for previous months.

Refined Products

The yield of gasoline was 44.1%, the same as in November and 0.1% higher than December, 1935.

December indicated domestic demand for motor fuel was 39,393,000 bbls., or 16% higher than a year ago. The domestic demand for fuel oil in December was 42,492,000 bbls., or 7% higher than a year ago. Had weather conditions been "normal" in December, these last relative gains might have been reversed.

The domestic demand for motor fuel for 1936 was 481,591,000 bbls., or 11% higher than in 1935. Stocks of gasoline rose 4,086,000 bbls. to 62,885,000 bbls., compared with 56,693,000 on hand at the beginning of the year.

Reed, Hollister Authors Of Geological Work

THE American Association of Petroleum Geologists has published a new book by Ralph D. Reed and J. S. Hollister, of The Texas Co., entitled "Structural Evolution of Southern California." The book describes the authors' theories as to the development and history of California formations and structures, and considers the area south from Coalinga to Newport and west from the edge of the Mojave Desert to the coast. Included with the book, which is priced at $2, is a tectonic map of the area discussed. Extra copies of the map alone may be had for 50 cents each.

Orders for the book or map should be forwarded to the A.A.P.G., Box 1852, Tulsa, Okla., or it may be ordered through the California Oil World.

The Association has also published a symposium on the Gulf Coast oil fields, to which 52 authors contributed. The book was edited by Donald C. Barton and George Sawtelle.

Coal Industry Sponsors Bill To Tax Fuel One Cent Per Gallon

Proposed measure would add immeasurably to cost of fuel for most industries. Would also drive bunker fuel oil trade to foreign ports.

A coal-industry sponsored bill to impose a one-cent per gallon tax on all fuel oil has been introduced into Congress by Representative Boland of Pennsylvania. The bill states that all fuel oil used for generating heat or power shall be so taxed, but specifically exempts fuel oil used in internal combustion engines.

The legislation has undoubtedly been inspired by the coal industry in its efforts to stem the tide of oil, now being used in practically all places where fuel is used.

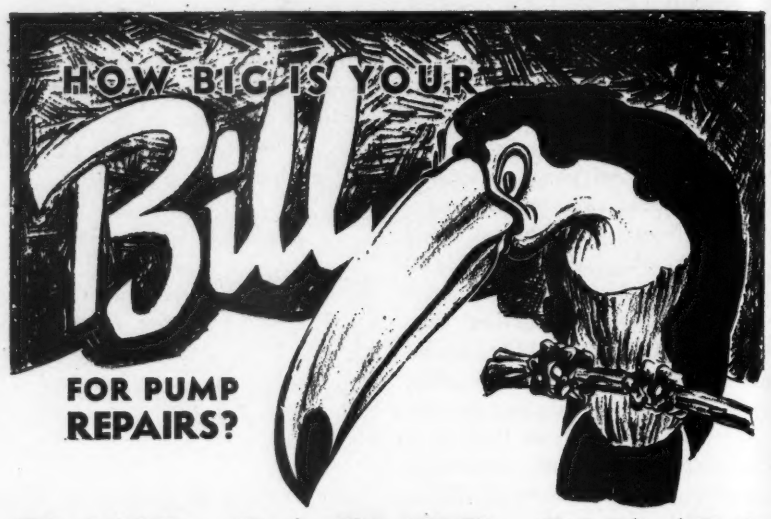
In general, this type of legislation is the worst possible type, it being aimed at one industry in favor of another. In its essentials, it merely subsidizes one industry at the expense of another, a proposition which has been condemned by all those who are familiar with the rudiments of economics.

Specifically, the legislation has numerous drawbacks.

Costs Raised

The unsound economic foundation of the bill would result in a definite retardation of economic recovery because of the unfavorable effects it would have on so many diversified groups of the population, as well as upon business in general. A tax on fuel oil would certainly raise the price of heating to the many householders, particularly throughout the east, who have installed oil burners in their house-heating systems. It would also add immensely to the cost of operation of any industry which now uses fuel oil rather than coal. For instance, the fuel bill of the Class I railroads would be increased $23,373,420 per year, with other industries, such as shipping, affected in proportion to the amount of fuel they use.

With present prices of bunker fuel along the Atlantic coast, there is a differential in favor of domestic production of 17 cents as compared with north European ports, and three cents as compared with South American ports. Obviously, a tax of 42 cents per barrel will make the domestic product higher than the foreign, and will undoubtedly drive considerable trade to foreign ports.



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Reduce DOWN-TIME---CUT PUMPING COSTS

We don't claim magical properties for Fluid Packed Pumps, although their performance is remarkable enough. They won't produce more oil than the formation will give up. But they WILL stay on the job month after month, (many have pumped steadily from 3 to 6 years without a minute lost or a cent spent for repairs). The savings which Fluid Packed Pumps effect by greatly reducing down-time and pump repairs will seem magical to you when you analyze them.

Fluid Packed Pumps work so economically and efficiently under bad sand conditions, where water and mud cuts are large, in all kinds of oil, and in deep wells with low fluid levels, that many operators praise them to the sky—but forget that they give economical, efficient service under ordinary conditions, too.

The Fluid Packed principle is logical—and simple—and easily proved on your own lease. The long telescoping tubes have an annular clearance between them of about 20/1000"—ample to carry large quantities of sand without freezing or causing excessive wear. The fluid being pumped fills the channels, forming a packing that retards slippage and never wears out. The normal wear that occurs during a long life cannot defeat the Fluid Packed principle—your continued savings are protected.

Refer to the Fluid Packed Pump Company section in your 1937 Composite Catalog, or write our nearest office for Complete details.

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Union Oil Reports Earnings Of $1.40 Per Share In 1936

Statement shows company's earnings to be highest of any period in last six years. Presages good reports from other companies.

Disclosing the largest earnings for the past six years, the annual report of stockholders of Union Oil Co. of California shows that the company's net profit for the year ended Dec. 31, 1936 amounted to $1.40 a share on 4,386,070 shares outstanding, as compared with $5,038,286 and $1.15 a share for 1935.

Commenting on the earnings, R. D. Mathews, executive vice-president, stated that, "Increased earnings resulted principally from the larger volume of crude oil produced and the improvement in prices for petroleum products, particularly for gasoline, commencing in April, 1936. Posted prices for crude oil were increased during February and March, 1936, and are now the highest since 1930."

Cash dividends amounting to $1 per share were paid during 1936, the same as for the previous year. Earned surplus at Dec. 31, 1936, amounted to $12,169,182, an increase of $1,747,328 during the year, the report stating that no provision for surtax on undistributed profits was required.

Profit before deducting depletion and depreciation charges aggregated $14,935,684 or $3.41 a share compared with $13,320,317 or $3.04 a share in 1935. Provision for depletion and depreciation for 1936 amounted to $8,802,286, equivalent to $2.01 per share, as compared with $8,282,031 and $1.89 per share for 1935, an increase of $520,255 and 12c per share. The increase is due principally to the additional amount provided for depletion and depreciation of oil lands and development occasioned by the larger quantity of crude oil produced during the year.

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Put GOODALL Patented SPARTAN Pump Suction Hose to work and note the difference. Patented "FLANG-LOK" connections provide full flexibility; special abrasive-resistant inner lining resists wear. No nipples to cut out or reduce the flow. Soon pays for itself by stopping costly vibration repairs.

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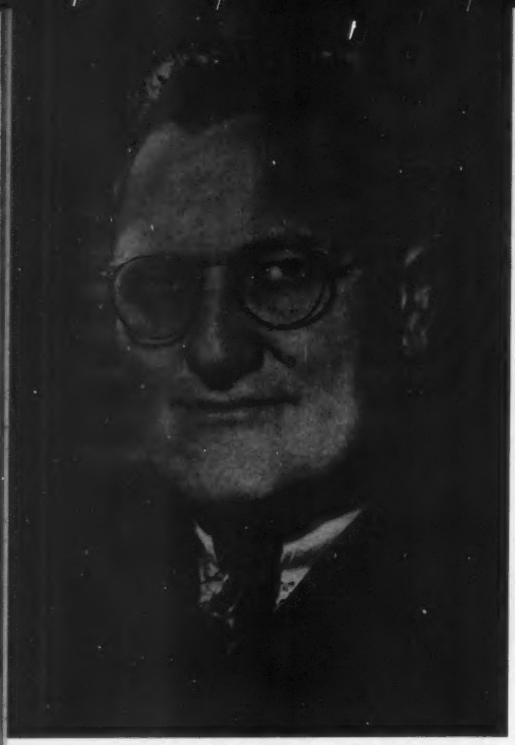


Heart Attack Fatal To Robert M. Ketchum

Manager of Purchases for General Petroleum Corp. dies after apparently being on the way to complete recovery.

Robert Milton Ketchum, manager of purchases for General Petroleum Corporation of California, passed away at his home at 10:45 last Sunday evening. Death resulted from heart failure. Mr. Ketchum had been recuperating from a similar attack suffered some weeks ago and his sudden death was a shock to his many friends, for it was believed that he had passed the crisis of his illness and would soon be back at his desk.

Born on a farm near Forest City, Iowa, on March 10, 1891, Mr. Ketchum completed his schooling at Los Angeles Polytechnic High School. He was very athletic in his younger days and for a time played professional baseball in Iowa.

In October, 1917, he left the Los Angeles Rubber & Asbestos Co. and entered the employ of the General Petroleum Corp. as a receiving clerk stationed at the Vernon warehouse. In February, 1919, he was promoted to the position of buyer with headquarters in the Los Angeles office. In March, 1920, he was made assistant manager of purchases, and in March, 1924, assumed the burden of responsibility for the department when he became manager of purchases for the corporation.

Rare indeed is the man favored with the friendships this man enjoyed. His range of friends was comparable with his many and varied interests, which included not only the petroleum industry and the purchasing profession, but the wide number of activities which would naturally attract a particularly intelligent and energetic man.

Mr. Ketchum was very closely associated with the Purchasing Agents Association of Los Angeles, of which organization he was president from June, 1927 until June, 1928. For many years he was a member of the board of directors of this body, and attended a number of national conventions as a delegate of the local group. As chairman of the Publication Committee, it was his duty—a duty which he regarded as a privilege—to supervise the editorial policy of the Southwestern Purchasing Agent, and it was in part due to his unceasing activity in its behalf that the magazine today enjoys such high favor among its many readers. During his term as president of the Purchasing Agents Association of Los Angeles, he inaugurated the first of a series of Miniature Industrial Expositions, an idea which has been carried on each year by the local group and which was copied in later years by every large purchasing agent's association in the United States.

Among Mr. Ketchum's outside activities was membership in the California Oil & Gas Association, Los Angeles Chamber of Commerce, Wilshire Country Club and Pentalpha Lodge of A. F. & A. M. He was recently appointed national secretary of the Boiler Committee, American Petroleum Institute. For several years he was Guardian of Bethel Lodge No. 95, Job's Daughters, girls' auxiliary of the Masonic Order. He also took an active interest in the All Nations Boys' Club. He was chairman of the General Petroleum Central Safety Committee, and has always displayed keen interest in every kind of safety improvement introduced into the oil business.

Mr. Ketchum leaves his wife, Charmian Ethel, two children, Frances Marie, 20, who is attending the University of Southern California, and a son, William Matthew, 14, a student at Harvard Military Academy. He also leaves four brothers, Clyde, of Long Beach, Zala, who resides in Los Angeles, Edward, of Riverside, and Roy F. Ketchum, a resident of Kansas City, Mo.

His death represents a loss which will be felt keenly by all who knew him. His friendly, yet always business-like manner caused him to be regarded by his associates as a splendid representative of modern purchasing.

Honorary pallbearers for Mr. Ketchum's funeral were:
E. L. Adams, F. C. Adams, W. L. Appleford, Arthur Baker, W. J. Boyle, Jr., Ward Blackburn, R. A. Brooks, J. A. Crawford, W. Cunningham, A. H. DeFriest, Don Dawson, S. J. Dickey, J. T. Durkee, J. A. Ellison, V. F. Grace, Bryce Gillespie, T. J. Hickey, Fred Isaacs, E. B. Kinney, Mike Lang, M. D. Leh, Mark Levi, W. C. Lynch, W. F. Lynch, J. L. Martin, W. L. McLaine, A. J. McLaren, R. L. Minckler, R. R. Morris, A. B. Nauert, N. C. Needham, G. F. Olsen, B. E. Parsons, T. E. Pierce, P. W. Prutzman, W. B. Pyles, J. D. Rush, W. D. Russell, J. W. Schmid, G. W. Schweinhard, L. N. Slater, B. P. Sibley, W. G. Smith, Ben Stroud, R. A. Sperry, C. M. Wagner, F. P. Weaver, A. L. Weil, L. R. Wells, R. C. Wheeler, A. O. Woll, D. W. Woods, and J. C. Wright.

Active pallbearers were:
E. W. Beck, R. T. Bostwick, O. P. Branyon, P. L. Burges, James Ross, P. J. Whiteley, C. F. Winans, and E. E. Wood.

Haylett New Head Of A. P. I. Committee

R. E. Haylett

R. E. Haylett, of the Union Oil Co., has been appointed chairman for 1937 of the central committee on refinery technology of the A.P.I. Division of Refining. J. B. Rather, of the Socony-Vacuum Oil Co., New York, has been appointed 1937 chairman of the Division's Program Committee.

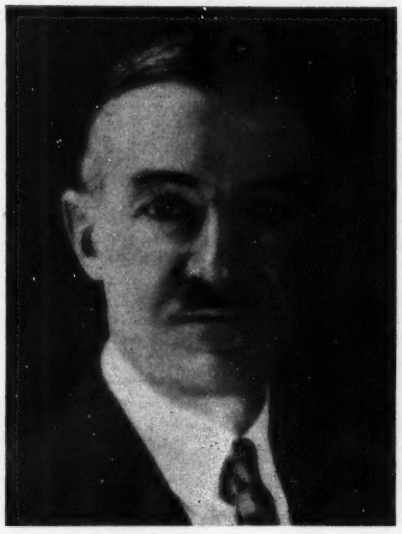
Chairman Haylett has announced the appointment of 1937 chairmen of several topical committees of the Central Committee on Refinery Technology. They follow:

Automotive Survey Committee, E. W. Isom, Sinclair Refining Co., New York; Committee on Accident Prevention in Refineries, Glenn Byers, Shell Petroleum Corp., St. Louis, Mo.; Committee on Corrosion of Refinery Equipment, Walter Samans, The Atlantic Refining Co., Philadelphia, Pa.; Committee on Disposal of Refinery Wastes, John S. Hess, Sinclair Refining Co., New York; Committee on Fire Prevention in Refineries, C. E. Townsend, Sun Oil Co., Philadelphia; Committee on Motor Fuel Research, T. B. Rendel, Shell Petroleum Corp., Wood River, Ill.; Committee on Sandardization of Refinery Equipment, Arthur E. Pew, Jr., Sun Oil Co., Philadelphia; and Committee on Testing Methods and Specifications, K. G. Mackenzie, The Texas Co., New York.

Saatjian Chairman Of Engineer's Committee

Announcement has been made of the appointment of K. N. Saatjian, of The Texas Co., Los Angeles, Calif., as chairman of the Engineers' Sub-committee of the American Petroleum Institute's Division of Production Committee on the Standardization of Wire Rope and Manila Cordage. The appointment was made by C. C. Scharpenberg, national chairman of the divisional committee.

It is expected that the sub-committee will contribute technical knowledge and experience to the standardization of wire rope and manila cordage used in oil-field operations. One of its first duties will be to review proposed changes in specifications.



In recognition of his service as Pacific Coast member of the committee that drafted tanker regulations for the United States Semaboat Inspection Service, A. O. Pegg, superintending engineer of Union Oil Co.'s marine department, was recently appointed vice-chairman of the Pacific Coast Marine Section of the National Safety Council.

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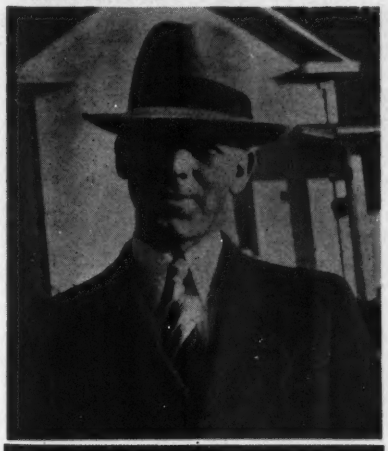

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From extensive past experience your Cavins Service man knows the right Cavins, the right accessories, and the right technique for your particular bailing or fishing problem. Following his expert instructions, your crew gets the job done with big savings in time, labor, money, and production.

Get set for these advantages on your next clean-out or fishing job by noting the nearest Cavins agency in the list below.

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